University of Alberta

Modernization and Fertility Change in Quebec: Structural and Cohort Effects

by

Catherine Dianne Scott Krull ©

A thesis to the Faculty of Graduate Studies and Research in partial fulfilment of the requirements for the degree of Doctor of Philosophy

Department of Sociology

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FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled MODERNIZATION AND FERTILITY CHANGE IN QUEBEC: STRUCTURAL AND COHORT EFFECTS submitted by CATHERINE KRULL in partial fulfillment of the requirements for the degree of Doctor of Philosophy

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Date June 13/96

DEDICATION

I would like to dedicate this thesis to my children, Matthew and Lindsey Krull, to my parents, Marilyn and Brian Scott and to my Grandparents, Lillian and Robert Scott, Hugh Ballantyne, Roberta and Charles Jones, Jr. I am very grateful for the love and support that I have received from them. Their influence touches my life everyday.

Abstract

Historically, fertility has been central to the survival of French Canadian culture in Quebec. Recently, the province has gone from having one of the highest fertility rates in the world to having one of the lowest. These changes in fertility have coincided with the socio-economic transformation (modernization) of Quebec society that took place gradually over time, and more intensively during and after the Quiet Revolution of the 1960s. At the present time, it is still questionable as to whether the province will be able to bring its fertility levels back to replacement levels, not withstanding government efforts to do so.

This thesis explains fertility change in Quebec from 1931-1991 at the aggregate level. Chapters 2 and 3 describe the historical details of Quebec before and after the Quiet Revolution. This historical analysis underscores how fertility is closely tied to the survival of Quebec culture and the French language, as well as to the status of women in Quebec society. In Chapter 4, the modernization thesis is used to understand the substantial decline in fertility of Quebec women in the post-Quiet Revolution period. A modified version of the modernization thesis is presented that addresses the decline in fertility due to the structural changes of modernization, and a more gradual diffusion of values supporting smaller family size. In Chapter 5, an age-period-cohort analysis of fertility is conducted in order to describe the abrupt structural changes (period effects) and the more gradual process of intergenerational socialization of women toward smaller families (cohort effects). Based on the greater impact of period, Chapter 6 provides a decomposition (path) analysis of period effects on age-specific fertility in Quebec. The

analysis draws on a theory that links modernization to social exchange, marriage and fertility. Finally, a conclusion is presented in Chapter 7 that addresses methodological issues raised by the statistical analyses, theoretical issues based on the findings and suggestions for further research into this important problem.

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"Modernization and Fertility Change in Quebec: Structural and Cohort Effects."

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CHAPTER 1: Introduction

The province of Quebec has long been of interest to social scientists because of its distinct historical and cultural characteristics. More recently, social research on Quebec has focused on the significant changes that have occurred in Quebec society since the Quiet Revolution of the early 1960's. These changes have been particularly notable in Quebec's family structures. In the past three decades, Quebec society has witnessed dramatic increases in divorce, voluntary childlessness, births to unmarried women and cohabitation, as well as a substantial decline in religiosity (Langlois et al., 1992). The predominantly Catholic province currently has one of the lowest Total Fertility Rates ever recorded for a human society (Caldwell and Fournier, 1987; Krull and Trovato, 1994), representing a dramatic reversal of its historically high fertility levels. The reversal has been accompanied by substantial changes in the role of women during the past three decades.

Changes in religiosity, education, female labour force participation, marriage and place of residence can be assumed as being determinants of change in fertility rates. It has been argued by some scholars that structural change affects the way that people view the process of family formation (van de Kaa, 1987; Wu and Balakrishnan, 1992). Similarly, it is argued in this thesis that Quebec's dramatic fertility decline is a function of shifts in ideologies that resulted from rapid modernization during the Quiet Revolution.

In Quebec society, before the Quiet Revolution, the values and attitudes toward women's proper role and towards family structure were heavily influenced by the authority of traditional and patriarchal structures such as 'the family', the State and the Catholic Church. Most women in Quebec married and began having children shortly after, since the only acceptable roles for women during this time period were that of wife/mother or nun (Dumont, et al, 1987). This was not the case after the Quiet Revolution, when social, economic and political opportunities opened up for women. They no longer were restricted to the roles of wife and mother and could pursue education and careers. Many women postponed marriage and childbearing. These changes where accompanied by a shift in values and attitudes, from traditionalism and patriarchy in the past, to individualism and secularism (Caldwell and Fournier, 1987; Krull and Trovato, 1994). Value and attitude shifts are undoubtedly of fundamental importance in Quebec's fertility pattern since the Quiet Revolution.

However, the values and attitudes that emerged during the Quiet Revolution did not occur instantaneously, nor were all individuals similarly affected by the socio-economic changes that took place during this time. Rather, the structural changes which occurred in the 1960s affected groups of individuals differently and at different times. The Quiet Revolution can therefore be viewed as a process involving both abrupt period changes as well as a slower diffusion of social values and attitudes. In terms of fertility, modernization would have an impact on Quebec women in two ways. First, the change from a traditional to a modern society could have a generalized effect on all women toward smaller families. This effect would be expected as women become more educated, less economically dependent and less controlled by traditional religious values supporting large family size. This impact of modernization would be detected as period effects in an age-period-cohort analysis. Secondly, the more gradual process of value and attitude change toward less children would involve the socialization of each generation of women in Quebec to reject pronatal values in favour of smaller family size. This socialization toward smaller family size would be indicated as cohort effects in an age-period-cohort model.

This thesis explains fertility change in Quebec from 1931-1991 at the aggregate level. This is done in two stages. The first stage involves the derivation of age, period, and cohort effects on fertility. Independent of age, this will determine the relative contribution of both the Quiet Revolution (period effects) and socialization (cohort effects) on fertility change in Quebec. This type of analysis can also detect differences in fertility across pre- and post-Quiet Revolution cohorts.

In the second stage of the study, socio-economic and demographic variables hypothesized to be associated with fertility change between 1941 and 1991 will be included in a path analysis. At the theoretical level, the variables in the path analysis reflect the demographic, economic and social influences of modernization on Quebec's age-specific fertility rates. Demographic effects involve changes in the sex ratio of unmarried men to unmarried women in Quebec. Economic influences, such as the earning power of women and male unemployment, are also included in the model. Finally, social changes in ideology, for instance, the rise of individualism, are tested in the analysis.

These large-scale structural conditions are theoretically related to fertility through the social exchange concept of gains to marriage. Essentially, as gains to marriage increase, men and women are more likely to choose marriage over other options, and higher marriage rates should insure greater fertility. Conversely, as gains to marriage decline, women and men should choose other options such as cohabitation and the pursuit of careers. Consequently, marriage rates should fall, resulting in lower fertility in Quebec.

Chapters 2 through 7 are organized to provide a systematic inquiry into the problem of Quebec's fertility decline. Chapters 2 and 3 describe the historical details of Quebec before and after the Quiet Revolution. This historical analysis underscores how fertility is closely tied to the survival of Quebec culture and the French language, as well as to the status of women in Quebec society. In Chapter 4, the modernization thesis is used to understand the substantial decline in fertility of Quebec women in the post-Quiet Revolution period. A modified version of the modernization thesis is presented that addresses the decline in fertility due to the structural changes of modernization, and a more gradual diffusion of values supporting smaller family size. In Chapter 5, an age-period-cohort analysis of fertility is conducted in order to describe the abrupt structural changes (period effects) and the more gradual process of intergenerational socialization of women toward smaller families (cohort effects). Based on the greater impact of period, Chapter 6 provides a decomposition (path) analysis of period effects on age-specific fertility in Quebec. The analysis draws on a theory that links modernization to social exchange, marriage and fertility. Finally, a conclusion is presented in Chapter 7 that addresses methodological issues raised by the statistical analyses, theoretical issues based on the findings and suggestions for further research into this important problem.

CHAPTER 2: The Status of Women and Family Structures in Quebec: The Pre-Quiet Revolution Period.[1]

2.1 Establishment of French Canadian Society (1608-1759)

From the time of the first permanent French settlement in what is now Quebec, population size has been viewed as central to the survival of French Canadian culture (Caldwell and Fournier, 1987). In 1608, Samuel de Champlain with 28 others established the colony of New France. By 1663, the population of New France had increased to just over 3,000 people and, by the time of the British conquest in 1759, there were approximately 70,000 French Canadians in the colony (Beaujot and McQuillan, 1982; Henripin and Péron, 1972). This phenomenal rate of population growth has been attributed to a very high rate of childbearing. Indeed, very few societies "have ever exhibited such prolific childbearing for so long a period of time" (Beaujot and McQuillan, 1982:4).

2.2 Status of Women in New France (1608-1759)

For the first hundred years, life in New France was harsh. Being in short supply, women were not restricted to domestic roles because the survival of the colony depended on the labours of everyone, irrespective of gender or social position.

> Because there was a need, women founded religious institutions, became merchants, soldiers, administrators and missionaries. Because there was a land to be opened up, hundreds of women 'as capable of work as any man' cleared land and helped to populate the colony (Dumont et al., 1987:49).

---

[1] A version of this chapter has been published. Krull, 1995. In Marion Lynn's (Ed.) *Canadian Families: A Reader:269-296.*

Thus, New France offered women who were willing to immigrate a chance to break from the traditional roles expected of them in France and, at the same time, the opportunity to play a vital role in the establishment of the colony.

Women's independence in the colony lasted only until the beginning of the 18th century when certain events resulted in their restriction to the domestic sphere. First, with the end of the Iroquois wars in 1701, women were no longer vital for defence of the colony. Second, with the fur trade no longer as lucrative as it had once been, many men turned to farming. Life on the resultant agricultural *seigneuries* depended on the work of large family units and, as such, marriage and having many children took on even more importance. Moreover, the number of land concessions made to parents often depended on the number of their male children. Third, marriage and family life became seen as a means of stability for the colony.

Between 1663 and 1673, the Crown sent almost 800 girls to the colony for the sole purpose of becoming wives. These girls were known as *filles du roi* -- the King's Daughters -- because their transport and dowry were supplied by the King. As the number of marriages increased, unmarried women in non-traditional roles became the exception rather than the norm. In a very short time, the only acceptable means available to women for economic security was either through marriage or by entering the convent. Finally, the Church's authority over women increased as more parishes were established in local farming communities. Education for girls was structured by the Catholic Church, with instruction focusing primarily on religion and sex appropriate subjects. Women who did not devote themselves to both family life and the Church were highly criticised. The image of the evil witch became one of the strongest stereotypes applied to women who did not conform (Dumont et al., 1987:93).

2.3 Marriage and Families in New France (1608-1759)

During the early part of the eighteenth century, French Canadian family structures were well-established. Although there existed some diversity in family forms[2] in New-France, certain characteristics of the early French Canadian family came to distinguish it from other family types:

> most families were similar in three specific areas: the dominant culture was French; the purpose of the family was procreation; and there was uniformity in the definition of age and gender roles. The father ruled, and wife and children were expected to obey (Garigue, 1967 in Peters, 1990:169).

As previously noted, the fertility rate in New France was one of the highest in the world, with birth rates ranging from 50 to 65 births per 1,000 population. Henripin (1994) has estimated that women in the colony, who married at fifteen years of age and who lived until the end of their reproductive years, had between 12 to 13 children (p. 27). However, not everyone married at fifteen years.[3] Moreover, the maternal mortality rates were higher in New France than in most European countries, which means that many women died before the end of their reproductive years. Taking these factors into account, the average number of children per married woman was approximately 7.1 for the period 1711 to 1865 (Henripin and Péron, 1972). This rate was still much higher than for married women in any of the European countries. Pronatalist attitudes were reinforced by the French Government, which offered an annual monetary reward to couples who had at least ten legitimate children.

---

[2] Wealth and social status accounted for most of the family variations in New France (see Beaujot and McQuillan, 1982:6).

[3] Although the average age at marriage for women born before 1660 was approximately 15.4, it had increased to 22 years for those women who were born in the first part of the eighteenth century. Beaujot and McQuillan (1982) argue that the average age at marriage increased when marriageable women were no longer in short supply in New France (p. 7).

Several factors account for the high birth rate under the French Regime. First, the average age of the population in the early years of New France was only 20.6. This means that the majority of women were in their fertile years. Second, young marriages were encouraged by government policies. Financial rewards were given to females who married under the age of sixteen and to males who married under the age of twenty. It was not uncommon for girls to marry as early as twelve or thirteen. Compared to most European societies during this period, the average age at marriage for females in New France was exceptionally young (Beaujot and McQuillan, 1982:7). Finally, marriage was viewed as a natural state, one that everyone would eventually enter and remain in until their death. In fact, in 1659, celibacy was actually forbidden by law (Peters, 1990:169). Divorce was unheard of in the case of unhappy marriages as family solidarity, rather than marital happiness, was the important consideration.

Elements of the family system that emerged in early New France would characterize French Canadian families for almost two and a half centuries. These features included patriarchy, sex-segregated roles, pronatalist attitudes, neolocal nuclear households, self-selection in mating (but with parental approval) and kin interaction (Nett, 1993:102). Until the middle of the 20th century, the Roman Catholic Church was central in maintaining a traditional patriarchal family system in Quebec.

2.4 Continuity of French Canadian Society (1900-1960)

Structures that characterized French Canadian society during the 17th and 18th centuries continued to do so until the late 1950s. For the first half of the 20th century, Quebec continued to be characterized as a rural traditional society (Behiels, 1986; Guindon, 1988; Hughes, 1943). Urbanization did increase in Quebec, but the province did not experience the modernization effects of the industrial revolution as did the rest of Canada. Pestieau (1976) suggests that in contrast to the rest of the industrializing world, "Quebec was almost completely cut off from important nineteenth-century currents, particularly those of industrialization and female emancipation" (Wilson, 1986:147).

An important mechanism in Quebec's delayed modernization was the omnipresent authority of the Roman Catholic Church, instrumental in keeping the province tied to a rigidly traditional ecclesiastical system. Of particular significance in this regard was the Church's control of educational institutions and its significant influence on the Quebecois family.

> Uninterested in questioning the established authorities and the excesses of industrialization, and wary of new ideas, the Quebec church was more interested in maintaining its privileged position than with helping Quebeckers enter the 20th century. It extolled the virtues of rural life, cautioned against the evils of the city and the dangers of education, and preached the need to accept one's lot in life (Latouche, 1988:793).

As in the days of New France, the Church continued both to define and provide French Canadians with their social, normative and cultural system. Thus, until the middle of this century, Quebec society was characterized by a high degree of homogeneity in social behaviors, something reflected in its strict obedience to the Catholic church, uniformly high fertility levels, universal marriage, an absence of divorce and rigid gender roles.

2.5 The Status of Women in Quebec: 1900-1960

The status of women changed very little after the 18th century. Acceptable roles for them remained that of wife/mother or nun. The family continued to be structured around the father, who had complete authority over all members of his family, including his wife. Women's subordinate status was especially notable in three areas: their access to an education, their employment opportunities and their loss of civic rights upon marriage.

Until the early part of the 20th century, high school education was only available to Anglophone girls in Quebec, whereas education for Francophone girls was restricted to primary schooling. After primary school, French girls from wealthier families had the option of enrolling in the private schools run by nuns. Educational training for women and the teachings of the Catholic Church were inseparable. Taught to value family life above all else, women were discouraged from pursuing advanced education or careers. In fact, women who worked outside the home were deeply criticized by the Church. Girls seeking further education were typically trained in the domestic sciences, which prepared them for their roles as wives and mothers.

Most married women were not employed outside the home during this period, although it was not uncommon for single women to be employed. More than half of the women who worked were under the age of 25. In 1921, 25.2 percent of women were employed while only 1.8 percent of working women were married. Of the 25.4 percent who were working in 1941, 3.3 percent were married. By 1951, 17 percent of working women were married. Earning approximately 58 percent of men's average incomes, women were employed primarily in three occupational sectors: factories, the service industries, or as office clerks. Because women's paid employment was viewed as only temporary until they married, very little was done to improve their work conditions.

Women's low status due to minimal education and limited options for employment decreased further once they became married. Although single women shared the same legal rights as most men, virtually all rights were lost when women married. Women's subordinate status was not only justified by the Catholic Church, it was legalized by the Quebec Civil Code. Women were legally defined in terms of general incapacity (akin to minors and interdicted persons) and were legally required to submit to their husbands. Also according to the Civil Code, wives were incapable of signing a legal contract, offering a defense or suing before the courts and were denied the right to schooling. A husband was free to seek a separation on grounds of adultery, but a wife could only do so if her husband kept his concubine in the common household. A wife could not engage in commerce without her husband's consent and only the husband had legal rights to administer property. Interesting enough, wives were responsible for their husbands' debts but husbands were not responsible for debts incurred by their wives. Moreover, a wife could not dispose of her own earnings nor did she have the right to correct her own children. In contrast, she did have the right to make a will and the right to supervise her children (Dumont et al., 1987: 254-255).

The lack of legal rights for married women was often justified as preserving the natural distinction between the sexes. For example, a jurist at the beginning of the 20th century argued that the lack of legal rights for married women "is based on the common interest of the husband and the wife, and the former would be jeopardized if the fate of their partnership were left to the lack of foresight and thoughtlessness of the member of the association who is the least competent to be in charge and whose very nature impels her to be subordinate" (in Dumont et al., 1987:252). Some people have even described marriage in Quebec at this time as the legal death of women.

Between 1929 to 1930, Quebec feminists lobbied for changes in the Civil Code, arguing that the restrictions imposed on women had changed very little since the days of New France. Women were finally given exclusive access to the money they earned as well as the right to administer and dispose of any assets they bought with that money. In addition, wives had the legal right to prevent their husbands from giving away joint property and could witness wills before a notary. However, these gains were of little comfort to those who fought for changes, and they paled in comparison to the gains that women had made in the rest of Canada. Between 1916 and 1922, Canadian women outside of Quebec had won the right to vote in provincial and federal elections and to run for public office. In 1929, women were legally recognized as persons and could be appointed to the Senate. Women in Quebec had to wait until 1940 before they were granted provincial voting rights or received access to an education and the right to work in certain professions. Even after achieving these rights, political participation by women in Quebec was almost non-existent. From 1940 to 1962, 35 women ran as candidates in provincial and federal elections; none of them were elected (Drouilly, 1980:9). Without political power or women's associations to defend their rights, women's low status remained firmly entrenched until the late 1960s.

2.6 Marriage and Families in Quebec (1900-1960)

Although there were a few changes in family structures, such as a shift in some of the authority of the *habitant* father to the civil government and a slight increase in the number of married women who worked outside the home (Peters, 1990), distinctive features of traditional French Canadian families were still apparent during the first half this century. An extended-family structure continued to characterize the rural areas. Although nuclear families were the norm in the urban areas, kinship membership remained important. Urban families lived in close proximity to one another and kinship obligations remained crucial. Thus, in many ways, the extended-family structure network was perpetuated in the city (Dumont et al., 1987:208).

Moreux (1971) found little differentiation between French Canadian families during the 1930s from those in the past:

> the French Canadian society, by and large, was rural and traditional [and] it placed prime importance on kinship relations, particularly on the values associated with such relations. The importance of the family as a primary group was reinforced by cultural homogeneity and by the pervasive control of the Catholic Church. The 'belief-system' in this context, especially inculcated by the clergy, [...] was that the male adult is the 'real finished product' of the traditional French Canadian culture, capable of mature judgment and integrity in private, religious, and civic life, by contrast 'immature youth' and 'weak womanhood' are incapable in these crucial respects (p.157-58).

The characteristics of French Canadian families described by Moreux during the 1930s continued to characterize familes during the 1950's. Based on his 1950s study of family and kinship among French Canadians of Montreal, Garigue (1956) found no evidence of a trend toward the transformation of the French Canadian kinship system. Membership in the Catholic Church, multiple kinship obligations, socialization in a large household, the

French language and a specific system of education continued to shape French Canadian family structures. Women's primary roles remained that of wives and mothers while male authority over women and children persisted. Garigue concluded that the "characteristics of urban French Canadian kinship are no new development, but seem to have been in existence since the period of New France" (p.135).

There continued to be a strong belief in the institution of marriage as indicated by high marriage rates and low divorce rates. Marriage rates in Quebec fluctuated very little from 1921 to 1956, averaging approximately 8 marriages per 1000 population. Divorce in Quebec was almost negligible compared to the national rates. In 1931, Quebec had a divorce rate of 0.4 per 1,000 population compared to the 6.4 national rate. In 1956, the rate for Quebec was 7.6 divorces per 1,000 population whereas the national rate was 37.4. The significant difference in divorce rates between Quebec and Canada shows that it was much more difficult to obtain a divorce in Quebec than it was in the rest of Canada. Quebec couples who wished to dissolve their marriage could either seek an annulment through the Church or apply for a legal decree of divorce through the federal government (Peters, 1990:172).

From 1921 to 1960, Quebec's pattern of fertility was distinct from that of English Canada and other industrialized countries (Beaujot and McQuillan, 1982:66). Crude birth rates remained higher in Quebec than in the rest of Canada.[4] In 1921, Quebec had a birth rate of 39 per 1000 population compared to the national average of 29.3 births. By 1956, the difference between the rates had narrowed considerably to 29.4 and 28, respectively. Long (1970) concluded from his analysis on fertility patterns among religious groups in Canada that the "distinctive features of Catholic fertility in Canada are most pronounced among the regionally-concentrated French Canadians, suggesting an interplay of religious, regional, and ethnic influences" (p. 135).

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[4] It is important to note that although fertility was significantly higher in Quebec than the rest of Canada, it nonetheless had been declining since the 1850s. However, it did so at a much slower rate than it did for the rest of Canada. From 1851-1921, the number of births per woman in Quebec decreased by 23 percent compared to a 51 percent decrease in the rest of Canada.

A more refined fertility measure is the total fertility rate (TFR), an estimate of the average number of children born to each woman, assuming that current birth rates remain constant (Weeks, 1989:112). In 1921, women in Quebec had an average of 5.3 children and more than half of the women living in rural areas of Quebec continued to have at least seven or more children (Beaujot and McQuillan, 1982:68). These rates are very high in comparison to Ontario and Canada where the TFRs were 3.2 and 3.5, respectively. Quebec's fertility rates remained higher than those of Canada or Ontario until the early 1960s.

Both the political elite and the clergy were aware of the political importance of high fertility to traditional French Canadian society. They promoted an ideology of "strength in numbers," often referred to as *la revanche des berceaux* (the revenge of the cradles) as a means of overcoming the Quebecois's subordination to the English (Gratton, 1992). This strategy was effective for approximately two centuries. Between 1760 to 1960, the world population increased three times and the European population increased five times; in the same period, the French Canadian population increased eighty times despite losing approximately 800,000 people to emigration (Beaujot and McQuillan, 1982:183-184).

From the days of New France until the late 1950s, Quebec society can be characterized as traditional and relatively homogeneous. French Canadians attached great importance to the the Catholic Church and to the family but saw little significance in education and individual prosperity (Lachapelle and Henripin, 1982:116-117). Traits that characterized family structures and women's position within the family remained more or less constant throughout this period. The argument has been made that the continuity of traditional French Canadian society was largely due to the 'elasticity' of the French Canadian kinship system which allowed the society to adapt to developments such as massive urbanization without undergoing any radical changes (Garigue, 1956). Based on the results of his analysis, Garigue concludes that there is reason to believe that the present French Canadian family system would continue as it has (Garigue, 1956:134). However, the upheavals that occurred in Quebec as a result of the Quiet Revolution would show that traditional French Canadian social structures were not resilient.

CHAPTER 3: Impact of the Quiet Revolution (1960-1991)[1]

The Quiet Revolution[2], began with the election of a new Liberal provincial government on June 22, 1960. This revolution has been described as both a political and an intellectual attempt on the part of Quebec society to catch up to the rest of Canada in social and economic development. The intellectual elite of Quebec advocated a new vision for the society, no longer based on the authority of the Church but on the philosophy of liberalism and secularization. This vision was reflected in government-instituted policies that promoted industrial development and urban growth (Behiels, 1986). According to Cormier and Klerman (1985):

> during this time period, social troubles and strong popular pressures forced the newly elected liberal government to adopt new policies based on such social-democratic ideas as income security, public ownership of natural resources, democratization of education, universal health care, etc. Following an era of ultraconservative social climate, two important phenomena occurred during this time period, namely, the rapid adoption of new liberal policies and the drastic change in social behavior (p. 112).

The most far-reaching change brought about by the Quiet Revolution concerned French Canadian values. With the disintegration of traditional values, the supposed homogeneity of French Canadian society gave way to increasing diversity.

3.1 Status of Women in Contemporary Quebec

Generating liberal values and advancing education for both sexes, the Quiet

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[1] A version of this chapter has been published. Krull, 1995. In Marion Lynn's (Ed.) *Canadian Families: A Reader:269-296.*

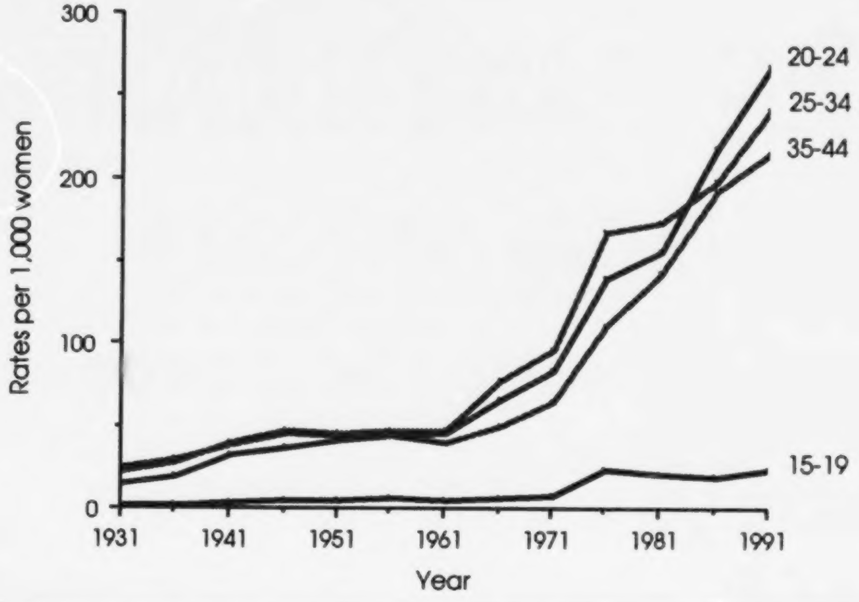
[2] According to Thomson (1984:2), the term *Quiet Revolution* is standard among Canadian academics but scholars are uncertain who created the term. Thompson maintains that the early sixties have been referred to as a revolution because it marked a dramatic turning point in Quebec history. Moreover, the social and economic transformations which took place in Quebec during this time occurred unexpectedly, almost "quietly" (Thomson, 1984:3).

Revolution had a dramatic impact on the lives of Quebec women. During the early 1960s, women demanded the removal of restrictions on their right to participate in political and social life; they also demanded equal wages for equal work, contraception and civic rights for married women. By 1969, Quebec feminists had become organized and the women's movement was well under way in the province. After 1969, women's groups grew at unprecedented rates. Based on a strong solidarity, these groups moved to bring about change, especially in the areas of education, employment and civic rights.

The Ministry of Education, created in 1964, gave girls the right to the same education as boys in co-educational schools. Both sexes were now entitled to a free education. The new educational system also resulted in several changes such as a decrease in private schools, the appearance of composite secondary schools, the abolition of domestic-science schools, the creation of *the Collège d'enseignement général et professionnel*, the founding of the multi-campus Université du Québec and the integration of teacher training into the university system. These reforms also had important consequences for convents. As women now had many opportunities other than the convent to pursue a career, many nuns chose to leave the Church. In fact, between 1968 and 1978, approximately ten nuns left the convent every week (Dumont et al., 1987:326-327).

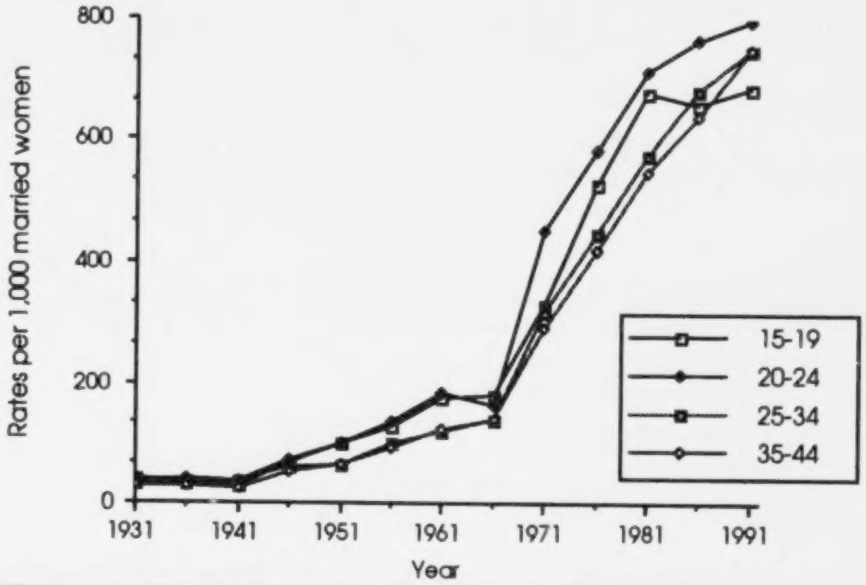
The most exceptional change involved the increase in the proportion of women who received post-secondary education. In 1961, 3.6 percent of women between the ages of 15 to 44, received an university education. By 1991, this proportion had increased to 8.9 percent. Women between the ages of 20 to 24 experienced the sharpest increase in university education, from 4.7 percent in 1961 to 27 percent in 1991 (see Figure 1). While the number of women with a university degree increased after the Quiet Revolution, the majority continued to specialize in traditional female fields such as education and health sciences, weakening the impact of education on women's status in Quebec society. In accord with these educational changes, the number of women employed in the labour force also dramatically increased after the Quiet Revolution; however, the types of jobs held by women changed very little, with the majority of women continuing to be employed in the clerical, health, teaching and service sectors.

Figure 1: Women 15-44 Years of Age with a University Education, Quebec: 1931-1991



Despite the obstacles facing women in terms of the type of employment available to them, the number of married women in the labour force significantly increased. By 1982, there were more married women in the labour force than there were women who lived alone. Between 1961 and 1991, the number of married women who were employed and still in their childbearing years increased from 15 percent to 74 percent (see Figure 2). In addition, women who worked and had chidren under the age of two increased from 30.2 percent in 1977 to 50.7 percent by 1984. Childless women remained stable during the same period of time with just over 60 percent employed in the labour market. Thus, married women with young children were most affected by modernization of Quebec society (Langlois, 1992:123).

Figure 2: Proportion of Married Women in the Labour Force, Quebec: 1931-1991.



Along with the changes that occurred for women in education and in the labour force, the legal rights of married women were considerably extended. On July 1, 1964, the Quebec Assembly passed Bill 16, giving married women equal rights with their husbands and equal responsibility for their children. The recognition of women's identities as being autonomous from their husbands has been a major victory for women in Quebec. In fact, women's equality in Quebec now surpasses that of most Canadian women (Eichler, 1988). This achievement is remarkable when one considers that Quebec women gained the vote and experienced the women's movement much later those in the rest of Canada.

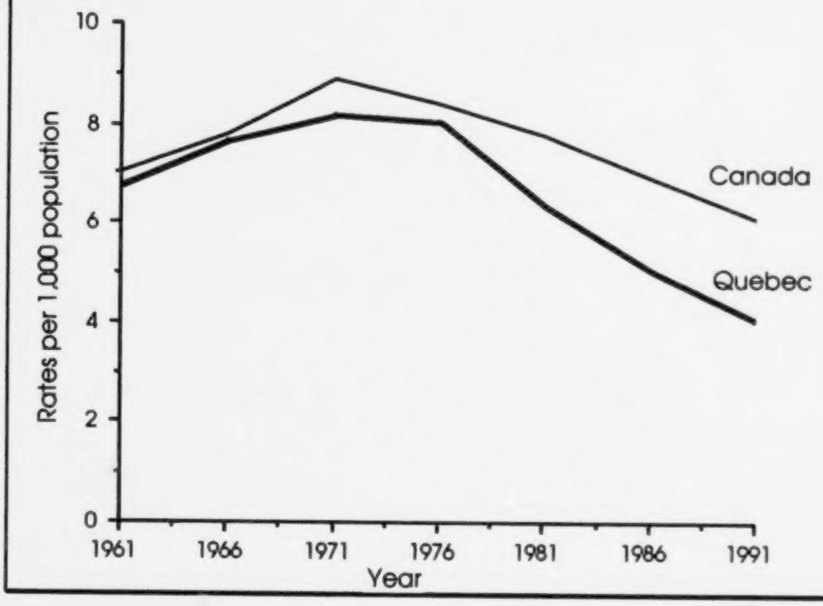
3.2 Marriage and Families in Contemporary Quebec

Marriage and family structures have changed considerably since the Quiet Revolution. There have been sharp declines in the rates of marriage and fertility. At the same time, substantial increases occurred in cohabitation outside legal marriage, in the divorce rate, and in births to unmarried women (Caldwell and Fournier, 1987; Krull and Trovato, 1994; Langlois et al. 1992). These changes have been attributed to the greater educational and occupational opportunites for women, as well as to the declining influence of the Catholic Church in Quebec. Secularization has weakened the authority of the Catholic Church and its influence on family life. According to Guindon (1988), a social historian, many Quebecers have become estranged from religion. This group views the church as less relevant to meeting its everyday needs and to providing solutions to everyday problems. Thus, the family structures that emerged after the Quiet Revolution bore little resemblance to the traditional ones for which Quebec had historically been noted:

> ...although traditional Quebec could and knew how to resist change in order to assure its *survival* after the conquest[...], today's Quebec has, so to speak, taken its revenge in the form of an impulse toward economic and political independence in which the family, once so dear to traditional Quebec, has borne all the cost (Houle, 1987: 5).

During the 1960s, marriage rates in Quebec followed the average for Canada. After this time, these marriage rates were significantly lower than those for Canada (see Figure 3). In 1971, Quebec had a marriage rate of 8.2 per 1,000 population compared to 8.9 for Canada. By 1991, Quebec's rate had dropped to 4.1 compared to 6.1 for Canada.

Figure 3: Marriage Rates, Canada and Quebec: 1961-1991.



Although the rates of first marriage for the majority of the provinces have been above the national average, those in Quebec have been approximately 33 percent below the rest of Canada (Dumas, 1988, 1991). The percentage of never-married individuals at age 50 is almost twice as high in Quebec compared to the other provinces, and the average age of marriage is about one year higher than for the other provinces (Dumas, 1994:36). Moreover, Quebec has the lowest proportion of married-couple families in all of Canada. In 1991, approximately 80 percent of families were married-couple families in all of the provinces with the exception of Quebec, where only 69 percent were married-couple families (Thompson, 1994:173).

Coinciding with the decrease in marriage rates, divorce and cohabitation have significantly increased since 1961. Liberalization of the divorce laws in 1969 resulted in a dramatic increase in divorces. The divorce rates in Quebec surpassed the national rate by the mid-1970s, remaining higher thereafter with the exception of 1986 (see Figure 4). In 1991, Quebec ranked third in comparison to the other provinces, with a divorce rate of 286.3 per 100,000 population, next to Alberta (322.6) and British Columbia (307). Although divorce rates have increased throughout Canada since 1969, the rate of increase for the province of Quebec has been exceptional. Cohabitation rates have also been significantly higher than the rest of Canada. In 1981, the number of persons in common-law unions was 8.13 per 100 unions in Quebec, 5.63 in Ontario and 6.4 in Canada. Between 1981 and 1986, Quebec's common-law unions had increased by 68 percent to 13.65; Ontario experienced only a 28 percent increase to 7.2 (Dumas, 1988:24). By 1991, the number of persons in common-law unions in Quebec was 19.01 per 100 unions whereas Ontario's was only 7.64. The popularity of cohabitation in Quebec suggests that common-law unions may have become an alternative to marriage in this province.

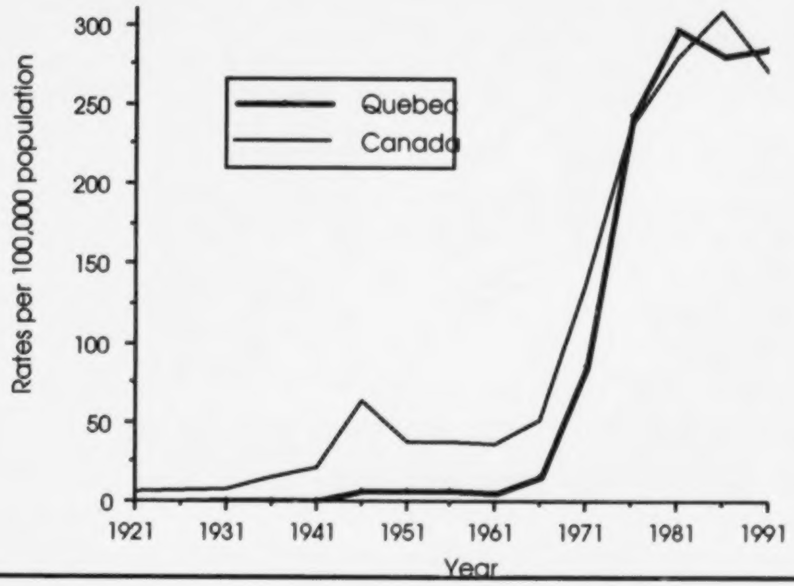
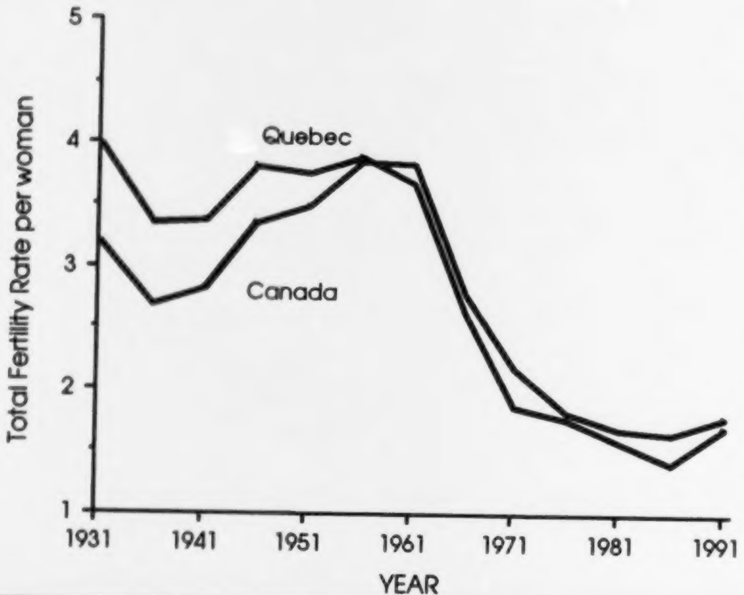


Figure 4: Divorce Rates, Canada and Quebec: 1921-1991.

Changes in reproductive behaviours also have been remarkable since the Quiet Revolution. Coinciding with the women's movement, the 1960s marked the peak in efforts for family planning and the beginning of the fertility collapse in Quebec. From 1961 onwards, the use of contraceptive methods became the norm for the majority of sexually active couples in Quebec. Moreover, voluntary sterilization and abortion increased considerably (Fréchet, 1992:129). By 1982, more than 42 percent of people in the reproductive ages had undergone some form of sterilization, while the total abortion rate increased from 178.5 per 1000 women in 1978 to 411.28 in 1990.

The family planning movement had a dramatic effect on Quebec's fertility rates. In the course of a few decades, Quebec's total fertility rates have gone from being highest in the industrialized world to the lowest. In 1961, Quebec had a totol fertility rate of 3.7 which decreased to 1.7 by 1991. Canada's rates were 3.8 and 1.8, respectively (see Figure 5). Quebec's fertility rate is insufficient to replace its population, since a rate of 2.1 is required for replacement. The sharp decline in fertility concerned many government officials. If Quebec's influence in Canada was directly related to the size of its population, then a continuing decline in fertility could threaten the province's cultural, social and

Figure 5: Total Fertility Rates, Canada and Quebec: 1931-1991.



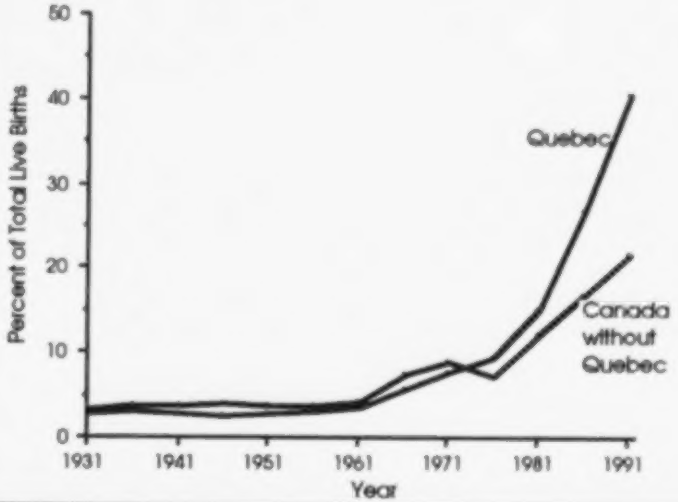
political well-being. As early as 1967, government officials were pressured by the leaders of the Council of French Life to offer financial inducements for higher fertility.

> The most crucial problem that confronts Quebec is not political, economic or educational, but one concerning family size. If births continue to decline in Quebec, neither independence, nor wealth, nor immigration can assure the survival of the French Canadian people. The Quebec government must be asked without delay for a birth-rate policy, and more broadly a family policy (translated by von Knorring, 1971:6).

The Council closed its report with the telling comment: "The conclusion is cruelly obvious: French Canada is on its way to losing the demographic battle which it had so successfully fought for three centuries, and even in Quebec" (p. 11). Despite these concerns, it was not until 1987 that the Quebec government implemented policies to increase births. Income tax breaks, subsidized day care, interest free home loans and baby bonuses were offered to families with children in order to make living conditions more comfortable. By 1991, after several amendments, the Quebec government agreed to pay couples $500 for a first birth, $1000 for a second and $7500 for a third and subsequent births (Régie des rentes du Québec, 1994:13).

Coinciding with the birth policies, Quebec's total fertility rate increased during the 1986-1991 intercensal period. In 1986, before the policies were in place, Quebec had a total fertility rate of 1.4 but, by 1991, the total fertility rate had increased to 1.7 births. This is the first time that Statistics Canada has reported an upward change in Quebec's fertility since 1956; however, it too early to tell whether the birth policies have been effective. If the ultimate goal of the policies is to promote the ideology of 'strength in numbers' by encouraging traditional French Canadian families to have more children, the incentives program may backfire. When the total fertility rates are broken down by marital status, the total fertility rate for married women actually decreased in 1991, whereas the total fertility rate for unmarried women sharply increased (see Figure 6). In 1991, births to unmarried women accounted for 40.7 percent of all births in Quebec, but only 26.4 percent of all births in Canada. This means that almost one out of every two births in Quebec is to an unmarried woman. Thus, the 1991 increase in the province's fertility rate is accounted for by an increase in the number of births to unmarried women rather than to married women. A speculation is that the birth incentive policies have inadvertently increased births to unmarried women living in common-law relationships. What effect this will have on Quebec society remains to be seen.

Figure 6: Births to Unmarried Women, Canada and Quebec: 1931-1991.



To summarize, characteristics of families in Quebec have dramatically changed since the Quiet Revolution of the early 1960s. Quebec now has the lowest fertility rates, the highest cohabitation rates and one of the highest divorce rates in Canada. What is most amazing about these changes is the relatively short period of time in which they have taken place. In a matter of a few decades, Quebec's traditional family structures have become indistinguishable from those in other industrialized societies.

CHAPTER 4: The Modernization Thesis and Fertility Decline

4.1 Overview

Fertility decline has often been explained as a by-product of industrialization and economic growth. Trovato (1988) argues that as society modernizes, "the individual becomes increasingly independent and less subordinate to the traditional forms of social control such as the extended family, the village, and the church" (p. 508). Likewise, McDaniel (1984) states that "it seems clear that traditional differences in fertility by ascribed characteristics are rapidly disappearing in light of a new set of factors related to economics and modernization of familial and social roles" (p. 5). Modernization has also been linked to fertility decline in currently developed nations.[1] "To the degree that all segments of society share in the benefits of the modern, organized sector, [...] fertility will decline" [2] (Radcliffe, 1978). Believing that the process of modernization accounts for fertility decline, Wu and Balakrishnan (1992) argue that in the course of modernization, "new demographic behaviours have been legitimized by replacing old norms by new attitudes and values towards marriage and family" (p. 2). Thus, the basic tenet of the modernization thesis is that as societies experience the process of modernization, new values and attitudes emerge that effect the demographic behaviours of a population.

In his seminal work, Westoff (1983) lists seven types of social change that occur during the process of modernization:

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[1] For a overiew of the modernization theories, refer back to Chapter 4.

[2] The demographic transition has been very different for currently developing nation. Unlike the fertility decline experienced during the modernization process of industrialized nations, many of currently developing nations continue to have high fertility during their modernization process. Moreover, certain developing countries such as Cuba, Kerala State in India and Sri Lanka have experienced fertility declines with minimal development (United Nations, 1990).

> Frequently (and inadequately) summarized by the term 'modernization', these include the erosion of traditional and religious authority, which promoted self-determination and relaxed sexual inhibitions, the growth of individualism, urbanization, the rise of mass education, the increasing equality and independence of women and women's growing awareness of their self-interest, and the ideology of consumerism. Such social changes, when combined with modern contraceptive technology, in some instances with delayed marriage, and, more recently, with legalized abortion, make very low fertility quite comprehensible" (p. 101).

More subtley, Lesthaeghe (1980) documents the ways in which the nature of the fertility transition is dependent on changes in the normative code and the system of social control (p.527). Lesthaeghe's work highlights the first two of Ansley Coales's preconditions for a marital fertility decline: "(1) fertility control must be advantageous in one way or another for the household concerned, and (2) the act of controlling fertility within marriage must be ethically and morally acceptable" (Lesthaeghe,1980:535). He maintains that fertility declines in a society when the regulatory mechanisms of its traditional normative code begins to include a greater tolerance for individual choice. Thus, as societies modernize, their ties to religious institutions becomes weaker; modern societies prefer instead a more secularized civil religion. Lesthaeghe and Surkyn (1988) conclude that:

> Greater religiosity and stronger public morality are negatively associated with the individuation dimension. Educational qualities of imagination and independence are strong positive correlates of individuation, and the same holds in the political sphere for greater employee control over means of production, protest proneness, and postmaterialism. ...Finally, sexual freedom, approval of unmarried motherhood, partnership outside marriage, and easier divorce loads positively on the individuation dimension, whereas social endogamy and parenthood tend to be modest indicators of the contrary (p.15).

Keyfitz (1984) also argues that fertility decline can be explained by changes in the normative code and ideologies of a society. For Keyfitz, fertility decline is explained by how changing women's roles are viewed in society. Keyfitz (1984) maintains that modernization and contraception led to the collapse of the breadwinner system and, as a result, freed women from the traditional male dependency. "Acceptable jobs for women have increased their weight in domestic decision making. Women's liberation gave them the moral right to decide whether or not to have a child, while the technology of the pill, the IUD, and sterilization put in their own hands the physical means to implement that right" (Keyfitz,1984:149). Thus, fertility decreases as a consequence of increasing both female labor force participation and women's wages, contraceptive technologies and decreasing marriage rates.

Along similar lines, Espenshade (1985) argues that with the different social and economic changes that occur in the process of modernization, traditional family functions -- for instance, economic and educational functions -- are significantly weakened and sometime completely forsaken. The consequences of these changes are a decline in the marriage and fertility rates (p.235).

Easterlin and Crimmons (1982) opine that the process of modernization is associated with the demand for children and the cost of fertility regulation. They define modernization as the positive changes in public health, education, urbanization, material well-being and per capita income. Each of these factors influences the supply (natural fertility and survivorship) and demand (tastes, incomes and prices) of children. They explain fertility differentials in terms of distinguishing between traditional and modern societies:

> In modernized societies, fertility is governed by the interaction of the factors shaping family size desires the potential output of children and the cost of fertility regulation. Child-bearing in pre-modern societies, though regulated by a variety of

> social and biological mechanisms working through natural fertility, is not yet viewed by the household as involving a potential problem of unwanted children. In contrast, in modern societies, fertility poses difficult problems of individual choice regarding the imitation of family size (p. 23).

Also relating fertility differentials in Quebec to the modernization process. Lachapelle and Henripin (1982) assert that before 1964, Quebec was "strongly impregnated with Catholicism, gave little importance to schooling but a great deal to family life and, above all, gave little encouragement to those seeking social and financial success" (p.116).

> Perhaps nowhere in the world was the Catholic large-family ideal more efficiently put into practice....Perhaps this was necessary for the political survival of the French-speaking community in Canada. But that also had a price: Quebec French Canadian families had to support an excessive number of children. Compared to the English-speaking families, this excess runs from 100 percent for women born around 1890 to 50 per cent for those who had just completed their families by 1961. That is a heavy load and one would be tempted to believe that certain qualitative objectives were sacrificed fro quantitative ones. That is verified at least for one important aspect of the French Canadian society: education (Henripin and Pèron, 1972:229).

A sustained natural increase and a decrease in mortality allowed Quebec to experience rapid modernization. The 1960's were marked by a Quiet Revolution that encouraged further education and brought political and economic success. Women experienced a rise in status vis-a-vis their increased participation in the work force and in political life. Female post-secondary education rates also dramatically increased after the 1960s. Concomitantly, there has been an erosion of Catholic authority, a decline of first marriages, later age at first marriage, high rates of common-law unions and higher divorce rates, all of which contribute to a decline in fertility.

Rao (1987) draws a similar conclusion regarding fertility in Quebec, arguing that, historically, French-Canadian women were totally consumed by the family. However, following the socioeconomic changes brought about by the Quiet Revolution, "motherhood is becoming a matter of taste and is often in competition with other social roles" (Rao,1987:28). As a result, Quebec women are not only having fewer children, but an increasing proportion are opting to remain childless. Analyzing the cohort trends and correlates of childlessness, Rao found an increase from 16.8 to 22.0 per cent in the proportion of ever-married childless women in Quebec over a ten year period (1971-1981). "According to the 1980 Quebec survey, almost nine per cent of those married between 1976 and 1980 do not plan to have any children" (Rao, 1987:32). Rao concludes that in Quebec, voluntary childlessness among ever-married women is a response to societal changes and "can be seen as more of a contributor to the overall lower level of fertility in 1981 compared to other provinces" (p.32).

Applying the modernization thesis to Quebec, it can be argued that in the course of significant social and economic transformation that resulted with the Quiet Revolution, a gradual shift in ideology took place, from one based on traditionalism, Catholicism and patriarchy to individualism, secularism and gender equality (Caldwell and Fournier, 1987; Krull and Trovato, 1994). The Church increasingly became irrelevant in meeting the needs of most Quebecers, many of whom stopped going to church altogether (Guindon, 1988; Gratton, 1992). Traditional gender roles, even within marriage, broke down as women chose to pursue education and employment opportunities. These changes in attitudes and values explain in part the significant decrease in Quebec's fertility rates since the early 1960s.

4.2 The Impact of Modernization: Abrupt Shift or Diffusion?

An important criticism of the modernization thesis concerns the way that modernization has been conceptualized by many academics in the past. Specifically, modernization has often been conceptualized as a unilinear evolutionary process that effects all individuals at a specific time and must always lead to changes in the demographic behaviours of all individuals in that society. In other words, modernization must always lead to a change in ideology, from one based on traditionalism to one centered on individualism and secularism; and this change in ideology effects the family values and consequent fertility behaviours of every individual in the population. In his comprehensive critique on evolutionary views of modernization, Gusfield (1967) points out seven fallacies inherent in this perspective. These are: developing societies have been static societies; traditional culture is a consistent body of norms and values; traditional society is a homogeneous social structure; old traditions are displaced by new changes; traditional and modern forms are always in conflict; tradition and modernity are mutually exclusive systems; modernization processes weaken traditions. Gusfield concludes that:

> The desire to be modern and the desire to preserve tradition operate as significant movements in the new nations and developing economies. It is our basic point here that these desires, functioning as ideologies, are not always in conflict; that the quest for modernity depends upon and often finds support in the ideological upsurge of traditionalism. In this process, tradition may be changed, stretched, and modified, but a unified and nationalized society makes great use of the traditional in its search for a consensual base to political authority and economic development. [...] the all too common practice of pitting tradition and modernity

> against each other as paired opposites tends to overlook the mixtures and blends which reality displays (pp. 358, 362).

The values and attitudes that emerged during the Quiet Revolution did not occur instantaneously for all individuals nor did all individuals similarly react to the socioeconomic changes that took place during this time. Instead, structural changes that occurred during the 1960s affected groups of individuals differently and at different times. Moreover, the period known as the Quiet Revolution should be viewed as a dialectical process whereby individuals and groups not only engaged in the changes that occurred, adapting them to their society and situation, but also altering the change process over time. Thus, the new ideologies were incorporated into the traditional order, not abruptly or as a unilinear process, but gradually, differentially affecting diverse groups of individuals.

This dialectic process of modernization would be reflected in differential fertility behaviours among various groups of women, depending on their age at a particular time (age-period effects) as well as the period during which socialization took place (age-cohort effects). The fact that we separate the period 1931 to 1991 into two distinct periods (the pre- and the post-Quiet Revolution) does not imply that, in 1960, there was a complete transformation in the values of people in Quebec. Obviously, attitudes and values that characterize the post-Quiet Revolution period were held by some prior to the 1060 and, just as obviously, traditional values and attitudes were still operating in the post-Quiet Revolution period.

The structural changes that occurred with the Quiet Revolution created changes in the attitudes and values of an increasing number of individuals, and these changes slowly diffused throughout Quebec society. Another example of this diffusion process is seen with the women's movement that emerged approximately ten years after the Quiet Revolution. Just as all individuals were not similarly affected by the Quiet Revolution, women's behaviour was not equally changed at the same point by the women's movement in Quebec. Both the women's movement and the Quiet Revolution must be viewed as events that had an increasing impact on individual behaviour over time, affecting various cohorts differently, depending on when socialization took place. An age-period-cohort analysis of Quebec's fertility begins to address this diffusion view of modernization and fertility. One hypothesis is that significant age-cohort effects account for some of the variation in Quebec's fertility. Such age-cohort effects would support the diffusion perspective of modernization.

In Chapter 5, the age-period-cohort effects on Quebec's fertility are analyzed. By including age, period and cohort simulataneously in a model, the relative impact of modernization on Quebec's fertility, as either an abrupt change (period effects), one of diffusion (cohort effects) or both, can be assessed.

CHAPTER 5: Cohort, Age and Period Effects of Fertility Decline in Quebec.

The measurement of period, age and cohort effects on fertility has long been established in demographic literature. Demographers often state mathematical models of age variation in vital events in order to examine age, period, and cohort sources of variation. Typically, period and cohort effects are included in models of age variation by allowing one or more parameters in the model to vary in intensity from period to period or cohort to cohort (Hobcraft, Menken and Preston, 1982:5). However, it is rare to find age, period and cohort included in the same analysis despite the fact that all three are important predictors of fertility.

It is well known that age is one of the best predictors of fertility. Although childbearing usually occurs between the ages of 15 and 49, there are considerable differences in the distribution of births in this age range over time.[1] Figure 5.1 presents age-specific fertility rates for Quebec from 1931-1991. The differences in fertility rates by age is quite obvious. The fertility rates for the age groups 15-19 and 45-49 have remained fairly constant over this time period. The pattern of rates for the age groups 30-34 and 35-39 appear very similar to the total fertility rates for Quebec during this period. From 1931 to 1941, there is a post-depression decline in the rates. This decrease in fertility started before 1931, and suggests that some aspects of modernization were developing

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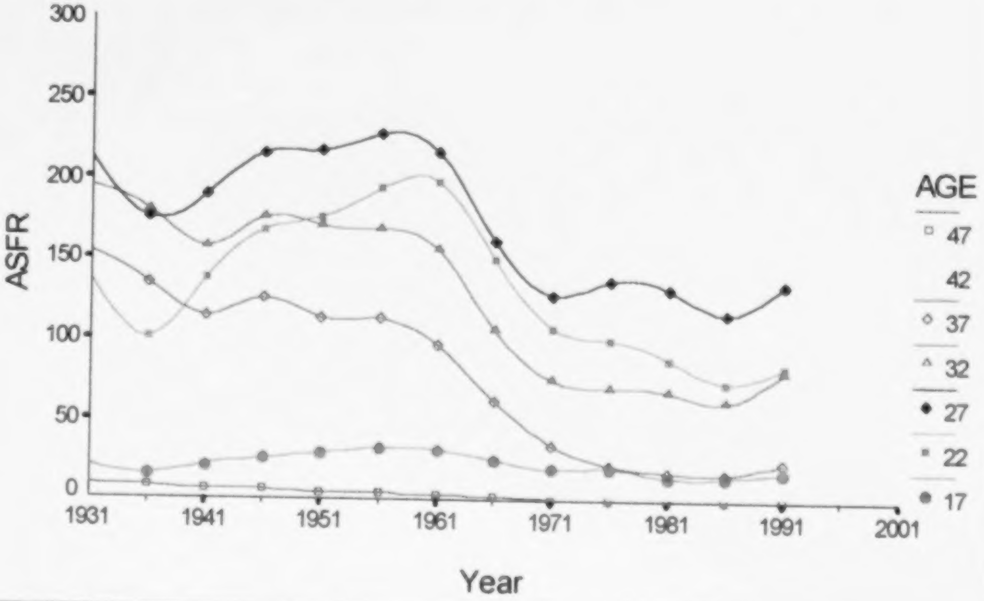
[1] There are several measures available to demographers that control for the variance of age in fertility rates. For example, the gross reproductive (GRR) and net reproductive rates (NRR) are summary measures of fertility that are independent of age. These, along with standardized rates are often used so that differences in fertility over time can be studied while controlling for the varying effects of age. However, these measures contain implicit assumptions about the period, age and cohort effects that underlie the observed data (see Hobcraft, Menken and Preston, 1982).

Figure 5.1: Age-specific Fertility Rates for Quebec, 1931-1991.



even before the 1930's. The slight increase from 1941 to 1956 indicates that the impact of the post-World War II years was almost negligible for these age groups in Quebec. This is in contrast to the rest of Canada, where there was a substantial increase in the rates for women 30-34 and 35-39 indicative of the baby boom phenomena (Wright and Maxim, 1994). From 1961 to 1971, there is a sharp decrease that dampens out over time. In 1991, the rates for both of these age groups slightly increases. The age groups 20-24 and 25-29 have a similar pattern to the two preceding age groups but more pronounced. The post-depression decline is much sharper but reverses earlier (1936). From 1941 to 1961, fertility rates in these age groups substantially increased, especially for the 20-24 age group where the increase is almost double that of the 25-29 age group. Although the rates for these age groups in Quebec did not increase as much as they did in the rest of Canada, they do nonetheless suggest that these women experienced a baby boom. After 1961, there is a precipitous decline for the 20-24 year age group until 1991, when the rates slightly increased. However, the sharp decline levels off for the 25-29 year age group after 1971, slightly increasing in 1976 and 1991.

Period effects are also important in terms of explaining age-specific fertility change. Societal events that take place at a certain point can influence the fertility behaviour of women in all reproductive ages. Wright and Maxim (1994) point out that "period effects not only refer to clearly demarcated events [such as variant economic conditions brought about by business cycles or the changes that occurred in Quebec after the Quiet Revolution] but also include longer-term social, cultural and economic processes. For example, Quebec's Quiet Revolution brought about several important period influences with respect to fertility, like increases in married female labour force participation and in female educational attainment, as well as a significant decline in marriage rates and in the number of people with a religious affiliation.

Cohort has also been an important predictor of fertility because the behaviours of distinct generations, with different past histories, can differ over time. Ryder (1965) defines a cohort as "the aggregate of individuals (within some population definition) who experienced the same event within the same time interval" (p. 845). Cohort effects capture cumulative generational phenomena. In other words, cohort effects occur whenever the past history of individuals exerts an influence on their current behaviour in a way not fully captured by an age variable (Menken and Preston, 1982:10). Examples of past history events that can effect fertility decisions would be cohort size, socialization, economic deprivation or surplus. In this study, cohort effects are interpreted in terms of a past history of economic and social events experienced by the aggregate of women born at a specific time in Quebec. The particular history of each generation affects subsequent generations through socialization practices that ultimately result in increases or decreases in fertility over generations.

According to Shryock and associates (1976), cohort analysis is more robust than period analysis because it permits a "better understanding and fuller explanation of annual changes in the event under study than period analysis alone, shedding light on some of the interacting factors affecting period data" (p. 551). Despite the considerations that favour cohort analysis over period analysis, the latter has been the most common approach used to study fertility change over time. However, many of the conclusions and predictions based on period analysis have since been proven wrong. "As a result, the relationship of a period-specific measure to the remaining life experience of cohorts active in that period has become as compelling a question for demographers as is the delineation of age, period, and cohort effects" (Hobcraft, Menken and Preston, 1982:5).

According to a review by Hobcraft and colleagues (1982), there has been relatively little done in terms of analytical research directed at the separation of age, period and cohort influences on fertility behaviour. In terms of extant research, there is contradictory evidence about the benefits of including cohort effects in an age-period model of fertility. Accordingly, questions regarding the interplay between period, age and cohort are often speculative. Some studies show that including cohort effects in an age-period model does not significantly explain any more of the variance in fertility than obtained by age-period effects (Pullum, 1980; Page, 1977; Wright and Maxim, 1994; Smith, 1981; Rindfuss, Morgan and Swicegood, 1988; Hsueh and Anderton, 1990, Foster, 1990). Since they indicate that modernization affects all groups of women simultaneously, the results from these studies are in opposition to the diffusion thesis discussed in Chapter 4. However, other studies have demonstrated significant cohort effects and support the diffusion thesis of period effects (such as modernization) on fertility (Sanderson, 1976; Lee, 1974, 1977, 1980). Specifically, these studies indicate that the impact of modernization is one of diffusion whereby groups of individuals are affected differently, depending on their past histories.

In an age-period-cohort analysis of fertility in the United States from 1920-1970, Pullum (1980) concludes that there is little support for independent cohort effects. He was unable to obtain a significantly better fit when he included cohort terms in an age-period model. His findings suggest that age-period models are superior to age-cohort models in terms of predicting U.S. trends in fertility. Page (1977) obtained similar results in her analysis on fertility differentials in Australia, England/Wales and Sweden. Like Pullum, she argues that it is not necessary to include cohort effects in an age-period model as the latter adequately explains the variance in fertility change over time. She concludes that:

> Our data show that, at any given time, all birth and marriage cohorts react, in some sense, as a single unit to whatever factors determine the general level of fertility at that time...It is as if each cohort were characterized by a latent exponential decline in its fertility as it passes through marriage, interrupted only by period effects to which all cohorts respond by proportionately the same amount (Page, 1977, in Hobcraft, Menken and Preston, 1982: 24).

Wright and Maxim (1994) attempted to demonstrate the existence of an inverse relationship between cohort size and Canadian fertility. However, their results indicate that there is no direct relationship between relative birth cohort size and fertility. Hsueh and Anderton (1990) also found that direct cohort effects were insignificant in their age-period-cohort study on frontier marital fertility in Utah. Foster (1990) found that including cohort in an age-period model only offered a limited contribution to cross-national studies of fertility change, supporting the view that "cohort patterns provide little more than a longitudinal summary of period fluctuations in fertility" (Hsueh and Anderton, 1990: 448).

Contrary to these researchers, Sanderson (1976) found significant cohort effects in his economic analysis of the baby boom. He calculated a set of age- and order-specific birth probabilities for successive cohorts of women born from 1900 to 1966. In accordance with Easterlin's hypothesis (1973, 1980), he found cyclical variations in the cohort components, especially for the lower birth cohorts. The importance of including cohort effects in an age-period model is also substantiated in the research by Lee (1974, 1977, 1980), who obtained significant cohort effects in his analysis of U.S. fertility rates.

Based on the empirical evidence, there is little consensus on the relevance of age, period and cohort effects in explaining variation in fertility. To complicate matters further, each of the above cited studies differ considerably in terms of the models estimated, the estimating procedure used, and the time periods covered (Wright and Maxim, 1994:179). Obviously, further research is needed before conclusive decisions can be made about the benefits of including or not including cohort effects in age period models of fertility. More importantly, support for the diffusion thesis of modernization (or the intergenerational transmission of the propensity to have the same number of children) is open to debate.

Age, period and cohort effects in this analysis allows for the assessment of the relative contribution of these factors in explaining variance in the fertility rates of Quebec women during the time period of 1931 to 1991. Such analysis can detect differences in fertility across pre-Quiet Revolution and Quiet Revolution generations. In addition, and perhaps most importantly for this thesis, an age-period-cohort analysis should determine the relative impact of modernization in Quebec's fertility trends.

5.1 Data, Design and Hypotheses

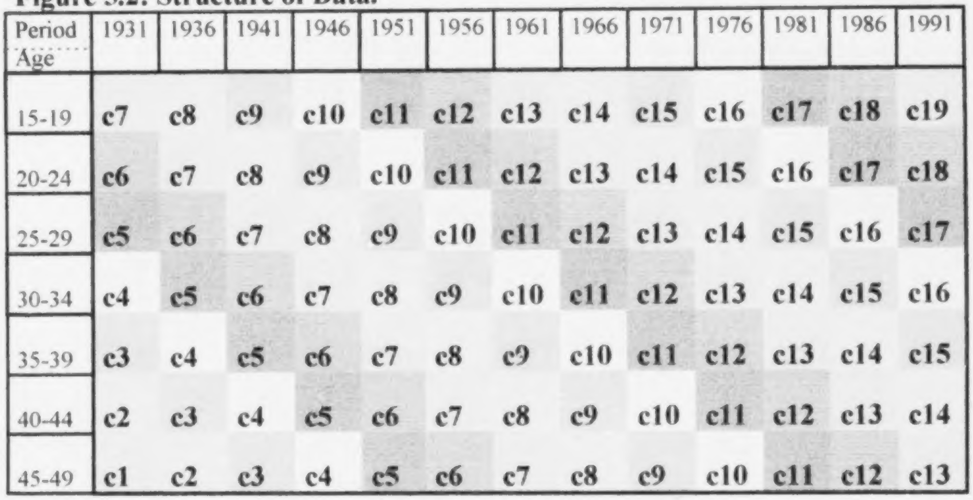
The dependent variable for this study is the age-specific fertility rate. As shown in Table 5.1 and Figure 5.2, there are seven age groupings and thirteen periods, giving 91 lines of data. There are also nineteen identifiable birth cohorts, calculated by the number of diagonal segments representing distinct generations. A constant-effect cohort model is derived from the two-way interactions in the age-period dimensions. Note that due to left-and right-hand truncation, twelve cohorts are incomplete.

The time period 1931 to 1956 represents the pre-Quiet Revolution period in Quebec, and the time interval between 1961-1991 represents the Quiet Revolution. According to the modernization thesis, these two different time periods, (pre-Quiet Revolution and Quiet Revolution), represent two diverse social and economic environments in Quebec history. The Pre-Quiet Revolution phase of Quebec history can

Table 5.1: Age, Period and Cohort Structure

AGE	PERIOD	BIRTH COHORT
15-19	1931-1935	1881-1885 (c1)
20-24	1936-1940	1886-1890 (c2)
25-29	1941-1945	1891-1895 (c3)
30-34	1946-1950	1896-1900 (c4)
35-39	1951-1955	1901-1905 (c5)
40-44	1956-1960	1906-1910 (c6)
45-49	1961-1965	1911-1915 (c7)
	1966-1970	1916-1920 (c8)
	1971-1975	1921-1925 (c9)
	1976-1980	1926-1930 (c10)
	1981-1985	1931-1935 (c11)
	1986-1990	1936-1940 (c12)
	1991-1995	1941-1945 (c13)
		1946-1950 (c14)
		1951-1955 (c15)
		1956-1960 (c16)
		1961-1965 (c17)
		1966-1970 (c18)
		1971-1975 (c19)

Figure 5.2: Structure of Data.



Period Age	1931	1936	1941	1946	1951	1956	1961	1966	1971	1976	1981	1986	1991
15-19	**c7**	**c8**	**c9**	**c10**	**c11**	**c12**	**c13**	**c14**	**c15**	**c16**	**c17**	**c18**	**c19**
20-24	**c6**	**c7**	**c8**	**c9**	**c10**	**c11**	**c12**	**c13**	**c14**	**c15**	**c16**	**c17**	**c18**
25-29	**c5**	**c6**	**c7**	**c8**	**c9**	**c10**	**c11**	**c12**	**c13**	**c14**	**c15**	**c16**	**c17**
30-34	**c4**	**c5**	**c6**	**c7**	**c8**	**c9**	**c10**	**c11**	**c12**	**c13**	**c14**	**c15**	**c16**
35-39	**c3**	**c4**	**c5**	**c6**	**c7**	**c8**	**c9**	**c10**	**c11**	**c12**	**c13**	**c14**	**c15**
40-44	**c2**	**c3**	**c4**	**c5**	**c6**	**c7**	**c8**	**c9**	**c10**	**c11**	**c12**	**c13**	**c14**
45-49	**c1**	**c2**	**c3**	**c4**	**c5**	**c6**	**c7**	**c8**	**c9**	**c10**	**c11**	**c12**	**c13**

Note: The diagonals represent distinct cohorts of women corresponding to C_1 to C_{19} above.

be characterized as a period in which the dominant culture was French, the purpose of the family was procreation, and there was uniformity in the definition of age and gender roles (Krull and Trovato, 1994; Garigue, 1967; Peters,1990). During this period, Quebec was primarily rural and traditional, and "the importance of the family as a primary group was reinforced by cultural homogeneity and by the pervasive control of the Catholic Church" (Moreux, 1971:157). Both the Catholic Church and the state played dominant roles in terms of placing limitations on women's roles. The Quiet Revolution period is characterized by rapidly changing norms and values as indicated by the women's movement, educational reform, declining authority of the Catholic Church, and acceptance of alternative family formations.

Cohorts 1 to 11 represent pre-Quiet Revolution cohorts because they entered their childbearing years prior to the Quiet Revolution and, presumably the values and norms that characterized this stage of Quebec society would have influenced their decisions on family formation and childbearing. Cohorts 12 to 19 represent Quiet Revolution cohorts because these generations of women entered their childbearing years during and after the Quiet Revolution and the values and norms that characterized this time period would have had corresponding effects on their fertility decisions. Thus, women whose primary socialization occurred prior to the Quiet Revolution theoretically should have different fertility behaviour than women who went through primary socialization after the Quiet Revolution.

It is expected that social and economic events influence cohort fertility through socialization from one generation to the next. Pre-Quiet Revolution generations, with their traditional pronatal social history, would be expected to socialize subsequent generations toward having larger families. However, these pronatal tendencies could have been over ridden by the experience of hard times during the economic depression of the late 1920s and early 1930s. This is to say that cohorts that experienced the depression may have socialized the next generation of women to have less children, even though Quebec remained a traditional society, valuing high fertility. On the other hand, Quiet-Revolution cohorts experienced modernization and the erosion of traditional values. Such a history could lead each generation of women to socialize subsequent generations to accept the need to have fewer children. Alternatively, the economic prosperity of the post World War 11 era, may have resulted in socialization for more children that continued with the Quiet Revolution cohorts. The timing and pattern of cohort effects would indicate whether modernization or economic past history influenced socialization for more or less children for each generation of Quebec women.

There is little doubt that modernization affects fertility through period effects. On this basis, one can hypothesize that period effects count for the post-1961 fertility decline. In this context, the Quiet Revolution and the abrupt modernization that ensued explain a significant amount of the variance in fertility in the period following 1961. Specifically, the diffusion thesis of modernization will gain strong support if cohort effects explain more of the variance in fertility than period. A finding that period accounts for most of the variance will support the rapid change thesis of modernization. Another possibility is that while both cohort and period are related to fertility change in the case of Quebec, one of these predictors has a more substantial impact than the other. For example, a substantial period effect could occur in the context of a less salient impact of cohort. Such a result would indicate an abrupt process of modernization, supplemented by a more gradual diffusion of an ideology through intergenerational socialization.

5.2 Identification Restrictions in Separating Cohort Effects from Age and Period

A problem that needs to be addressed in this type of analysis concerns the simultaneous identification of age (A), period (P) and cohort (C) effects. This is because of the linear dependence between any one effect and the other two (e.g.., C=P-A; P=C-A; and A=P-C). In other words, the linear component of any one set of effects is the sum of the difference of the linear components of the other two sets of effects (Trovato, 1988:39). In order to include age, period and cohort in a single model to analyze their separate effects on fertility, this dependency must be statistically adjusted.

Wright and Maxim (1994) have pointed out that the specification and estimation of age, period and cohort effects has received a great deal of controversial attention in the literature. Although some scholars have suggested that it does not make sense conceptually to speak of three distinct effects (Glenn, 1976; Rodgers, 1982), the consensus appears to be that this perspective is overly restrictive (Hagenaars and Cobben, 1978; Hobcraft, Menken and Preston, 1982; Smith et al., 1982). The position taken here coincides with Maxim (1985), namely that while age, period and cohort effects cannot be considered as mathematically orthogonal to each other, they constitute unique determinants of fertility from a substantive perspective.

To overcome this identification problem, certain *a priori* assumptions must be made about the effects between certain categories of the three factors. Hobcraft, Menken and Preston (1982) have described in detail several of the methods that can be used to resolve age-period-cohort identification problems. The procedure selected for this analysis is one originally proposed by Knoke and Hout (1974) and adopted by Trovato (1988). Its requirements include restricting any two categories so as to have identical effects for two of the three factors (e.g. two categories in both age groups and periods, in both age groups and cohorts or in both periods and cohorts). Although identifying the accurate restrictions can never be completely ascertained, Trovato (1989) suggests that the decision as to which categories one restricts should be "guided by sound reasoning coupled with a priori knowledge of the particular phenomenon in question" (p.149). In this study, the two youngest birth cohorts, 1881-1885 (C_1) and 1886-1890 (C_2), are constrained to have equal parameters. In addition, the 1931-1935 and the 1935 -1940 periods are fixed to have identical effects. These categories were chosen over the others because they represent women who were least affected by either modernization or the Quiet Revolution Their childbearing years occurred well before the Quiet Revolution and as such, they were the most influenced by traditional norms and values regarding family formation.

5.3 Methodology

The structural model being estimated in this study can be written as follows:

$$f(Y_{APC}) = \alpha + \Sigma\beta \text{Age}_i + \Sigma\beta \text{Period}_j + \Sigma\beta \text{Cohort}_k + e_{ijk},$$

subject to the constraint:

$$\Sigma\beta_i = \Sigma\beta_j = \Sigma\beta_k = 0.$$

where:

$f(.)$ = logit transformation of the fertility rate;

Y_{APC} = age-period-cohort specific rates;

α = constant of the linear equation;

Age_i = 'effect' coded variables representing age effects;

Period_j = 'effect' coded variables representing period effects;

Cohort_k = 'effect' coded variables representing cohort effects;

$\Sigma\beta_i$, $\Sigma\beta_j$, $\Sigma\beta_k$ = regression parameters estimated with Ordinary Least Squares;

e_{ijk} = a residual term in the equation.

The logit transformation is applied to the fertility variable because it is the most appropriate transformation for demographic rates (it avoids out of range expected values) (Hagennars and Cobben, 1978; Hobcraft Menken and Preston, 1982). The age dummy variables represent the effects of age groups against the reference category 45-49. The period dummy variables represent the effects of the 5 year census periods against the reference category 1991-1995. The cohort dummy variables represent the effects of the 18 different cohorts against the reference category of 1971-1975.

A simplified version of the above model would be as follows:

$$F = Age + Period + Cohort + residual,$$

(biological and age pattern)	(Historical Events, Modernization Thesis)	(Intergenerational socialization of family size; Diffusion Thesis of Modernization)

'Age' can be construed as representing the effects of biology and the age pattern of fertility. 'Period' can be thought of as a proxy measure for the abrupt effects of historical events on fertility. 'Cohort' is treated as a proxy measure for the intergenerational transmission of propensity for having a specific number of children (whether high or low) and, thus, indirectly tests the diffusion thesis of modernization. The parameters of this model are estimated using Ordinary Least Squares regression (OLS).

As a confirmatory technique, the data are also analyzed with a loglinear model appropriate for the analysis of rates (Agresti, 1990; Clogg and Eliason, 1987; Trovato, 1987). The data for this technique conform to the cross-tabular structure: Age x Period x Cohort. The unit of analysis is the Age-Period-Cohort specific cell in this multiway tabulation. This method also allows one to assess the net age, period and cohort patterns when the confounding effects of each factor are controlled.

This model can be written as follows:

$$\mathrm{Ln}[B_{apc} / P_{apc}] = \lambda + \lambda_{i\,Age} + \lambda_{j\,Period} + \lambda_{k\,Cohort}$$

where:

B_{apc} =the number of births by age, period and cohort,

P_{apc} = the age-period-cohort specific population,

λ = the average of the natural logarithm of fertility rates (intercept term),

$\lambda_{i\,Age}$ = the parameters for dummy variables, representing age effects (i=1,...,7),

$\lambda_{j\,Period}$ = the parameters for dummy variables representing period effects, (j=1,...,13),

$\lambda_{k\,Cohort}$ = the parameters for dummy variables representing cohort effects, (k=1,...,19).

The same reference categories and identification restrictions were used as in the least squares procedure, but the parameters are computed with the loglinear subroutine in SPSS.

5.4 Results

Table 5.2 presents OLS regression results of the logit of fertility rates in Quebec, while Table 5.3 presents the loglinear results. Both models produced very good fits because an R^2 of .991 was obtained with the OLS model and a pseudo R^2 of .985 was obtained for the loglinear model. Very similar results were obtained with both models.

Table 5.2: Parameters for Age, Period and Cohort Effects (Least Squares Method)

Effects	(r)	(b)	(b)	(t)	R² Change
Age					(.758)
15-19	.391	-1.165	-.341	-3.150	
20-24	.666	.988	.290	3.958	
25-29	.718	1.564	.459	11.671	
30-34	.656	1.322	.388	22.753	
35-39	.550	.729	.214	5.372	
40-44	.363	-.488	-.143	-1.936	
45-49 (R)					
Period					(.151)
1931-1935*	.200	.944	.246	1.305	
1936-1940*	.200	.944	.246	1.305	
1941-1945	.163	1.088	.234	1.978	
1946-1950	.175	1.297	.279	3.008	
1951-1955	.169	1.288	.277	4.121	
1956-1960	.170	1.285	.277	6.488	
1961-1965	.161	1.107	.238	10.887	
1966-1970	.118	.522	.112	4.946	
1971-1975	.060	-.286	-.062	-1.393	
1976-1980	.024	-.968	-.208	-3.017	
1981-1985	-.001	-1.589	-.342	-3.611	
1986-1990	-.020	-2.199	-.473	-3.921	
1991-1995 (R)					

Table 5.2 Continued...

Table 5.2 Continued

Effect	r	b	β	t	R^2 Change
Cohort					(.081)
1881-1885*(1)	-.046	.108	.012	.102	
1886-1890*(2)	-.046	.108	.012	.102	
1891-1895 (3)	.027	-.333	-.038	-.363	
1896-1900 (4)	.062	-.617	-.079	-.774	
1901-1905 (5)	.088	-.855	-.119	-1.265	
1906-1910 (6)	.101	-1.001	-.149	-1.805	
1911-1915 (7)	.072	-1.048	-.166	-2.414	
1916-1920 (8)	.066	-1.031	-.164	-3.169	
1921-1925 (9)	.039	-1.038	-.165	-5.076	
1926-1930 (10)	-.003	-1.031	-.164	-9.402	
1931-1935 (11)	-.048	-.928	-.147	-8.523	
1936-1940 (12)	-.094	-.743	-.118	-3.651	
1941-1945 (13)	-.116	-.353	-.056	-1.113	
1946-1950 (14)	.001	.264	.039	.604	
1951-1955 (15)	.058	.857	.119	1.537	
1956-1960 (16)	.077	1.392	.177	2.045	
1961-1965 (17)	.054	1.696	.194	2.110	
1966-1970 (18)	.021	2.075	.206	2.231	
1971-1975 (19)(R)					
Constant	-2.927				
R^2 (R^2 ADJ.)	.991 (.985)				
F regression (df)	179.095 (34/56)				

Note: * indicates the coefficients constrained to be equal and (R) indicates the omitted reference categories. A t-value lower than 1.96 is considered to denote a statistically non-significant effect. Also note that (r) is the zero-order coefficient of each variable with fertility; (b) is the regression coefficient, (β) is the standardized coefficient, (t) is the test statistic for significant effects.

Table 5.3: Parameters for Age, Period and Cohort Effects (Loglinear Method)

Effects	(λ)	(Z)	(e^{λ})
Age			
15-19	-1.107	-67.483	0.331
20-24	.901	83.426	2.462
25-29	1.370	236.464	3.935
30-34	1.135	371.351	3.111
35-39	.644	100.269	1.904
40-44	-.401	-35.013	0.670
45-49 (R)			
Period			
1931-1935*	.841	26.666	2.319
1936-1940*	.841	26.666	2.319
1941-1945	.944	38.937	2.570
1946-1950	1.098	57.554	2.998
1951-1955	1.057	76.133	2.878
1956-1960	1.008	114.933	2.740
1961-1965	.809	184.384	2.246
1966-1970	.244	53.370	1.276
1971-1975	-.415	-45.678	0.660
1976-1980	-.816	-57.556	0.442
1981-1985	-1.274	-65.379	0.280
1986-1990	-1.709	-68.752	0.181
1991-1995 (R)			

Table 5.3 Continued...

Table 5.3 Continued

Effect	**λ**	**Z**	**e^{λ}**
Cohort			
1881-1885*(1)	.041	.919	1.042
1886-1890*(2)	.041	.919	1.042
1891-1895 (3)	-.325	-8.273	0.723
1896-1900 (4)	-.509	-14.752	0.601
1901-1905 (5)	-.722	-24.519	0.486
1906-1910 (6)	-.851	-34.259	0.427
1911-1915 (7)	-.935	-46.874	0.393
1916-1920 (8)	-.901	-61.769	0.406
1921-1925 (9)	-.856	-89.505	0.425
1926-1930 (10)	-.765	-142.427	0.465
1931-1935 (11)	-.620	-127.147	0.538
1936-1940 (12)	-.373	-42.753	0.689
1941-1945 (13)	-.046	-3.342	0.955
1946-1950 (14)	.354	18.740	1.425
1951-1955 (15)	.731	30.216	2.077
1956-1960 (16)	1.098	37.202	2.998
1961-1965 (17)	1.333	38.121	3.792
1966-1970 (18)	1.451	35.647	4.267
1971-1975(19)(R)			
L^2_m	15117.6		
d.f.	1477		
L^2_B	1036332.3		
d.f.	1511		
R^2_A	0.985		

Note: * indicates the coefficients constrained to be equal. The R^2_A is a pseudo R^2 measure and is computed as follows: $1-(L^2_m/L^2_B)$ where L^2_m = the model log-likelihood chi square; and L^2_B = the baseline log-likelihood chi-square (intercept only). Z values below 1.96 are considered statistically insignificant. (R) indicates the omitted reference categories.

Table 5.2 (the OLS model) shows the decomposition of variance explained in fertility (R^2 change) by age, period and cohort. Not surprisingly, this decomposition demonstrates that age is the best predictor of variation in the age-period-cohort specific rates (R^2_{age} = .758). Period effects contribute an additional 15 percent to overall variance explained. Cohort effects contribute .081 or 8 percent additional variance to the overall R^2 of .991. In terms of proportionate reduction of error in predicting fertility, period has twice as much error reduction as cohort.

Looking at Tables 5.2 and 5.3, as well as the graphic representation of the age effects in Figures 5.3 and 5.4, the distribution of the coefficients for age effects on fertility is consistent with what one would expect: that the largest positive coefficient (b=1.56; λ=1.37) occurs for the 25-29 age group and the size of the age estimate decreases sharply for the older age groups. The age effects are statistically significant in both the OLS and the loglinear models (a t-value for the OLS model or a z-value for the loglinear model that is equal to or more than 1.96). This distribution quite strikingly illustrates the major non-linear impact of age on the reproductive process.

Figure 5.3: Parameters for Age Effects, OLS Method.

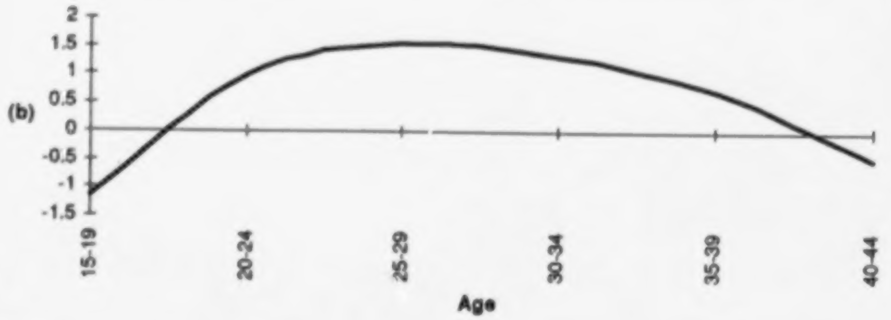
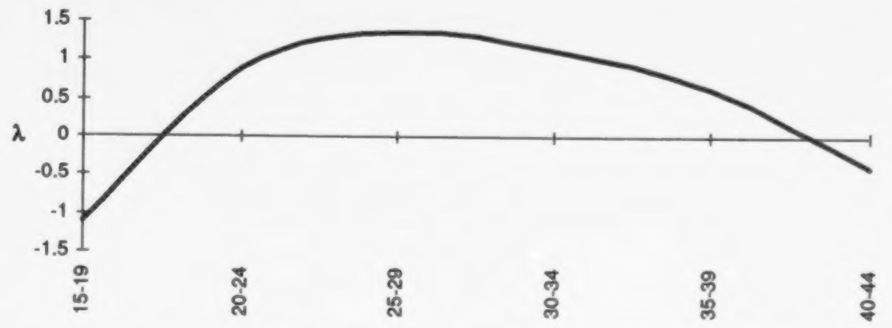


Figure 5.4: Parameters for Age Effects, Loglinear Method.



Figures 5.5 and 5.6 show the distribution of the coefficients (b's and λ's) for period by year interval (see also Tables 5.2 and 5.3 for period), the pattern being very similar to that of Quebec's total fertility rates. The effects of period on fertility (adjusting for age and cohort) are positive (b=.944; λ=.841) for 1931 and 1936, but these results were significant only with the loglinear model, rendering the significance of this positive effect inconclusive. From 1941 through 1960, the positive and statistically significant impact of period on fertility strengthened (1956-1960: b=1.29; λ=1.01). The onset of the Quiet Revolution in 1961 is followed by a ten year decline in the positive impact of period, followed by an increasingly negative effect from 1971 (b=-0.29; λ=-0.42) through 1990 (b=-0.-2.20; λ=-1.71). The strong negative impact of period on fertility during the Quiet Revolution provides support for the modernization thesis. In other words, the modernization of Quebec caused an abrupt shift in women's reproductive behaviour, reflected as an increasingly negative impact of period on fertility.

Although period effects[2] only proxy underlying causal factors, and, thus, are not in a strict sense explanatory, the observed distribution is consistent with previous explanations of fertility trends in Quebec. In a relative sense, they suggest that period influences that affected fertility behaviour in the baby boom or during the post depression years are less significant than the period influences of the post-Quiet Revolution decline.

Figure 5.5: Parameters for Period Effects, OLS Method.

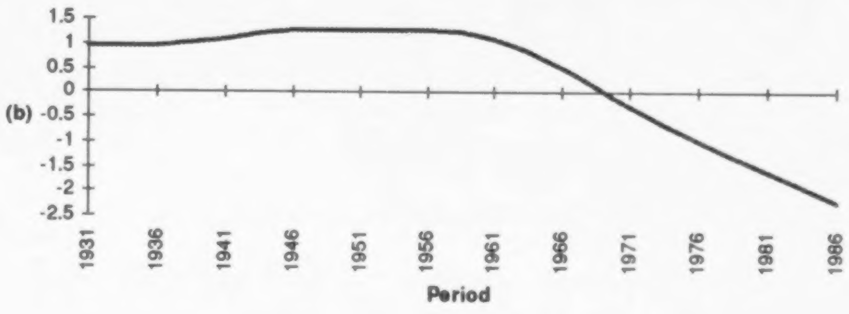
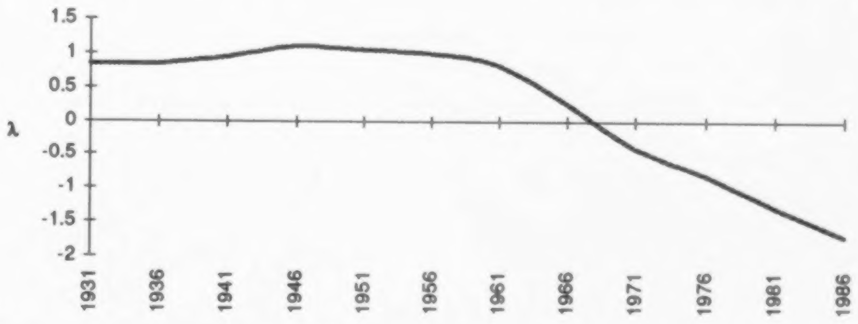


Figure 5.6: Parameters for Period Effects, Loglinear Method.



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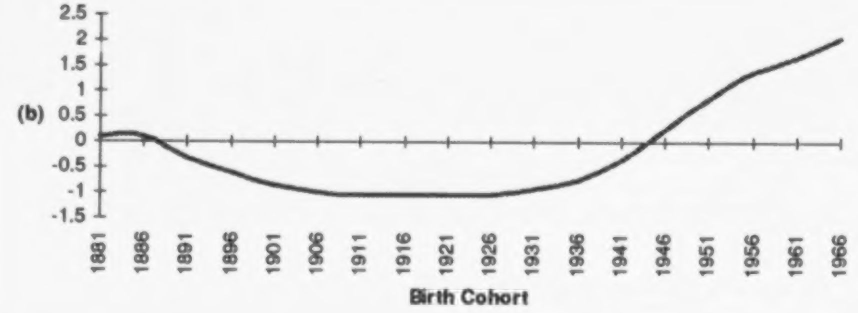
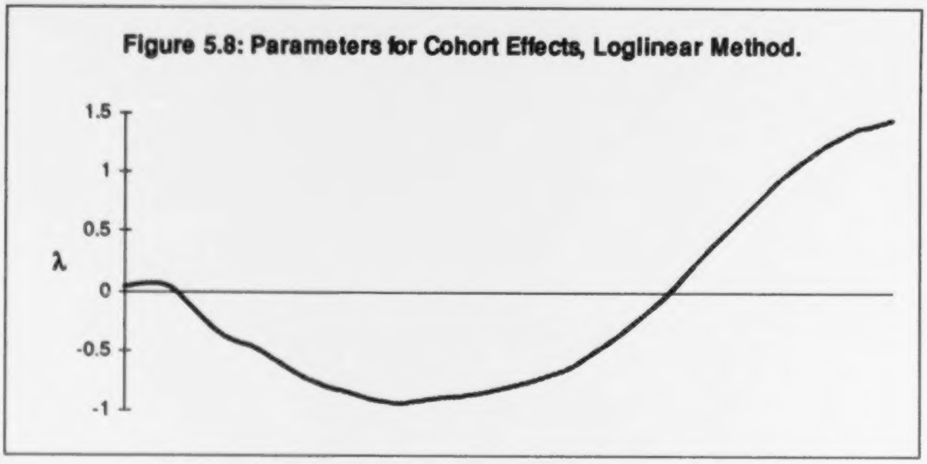
[2] The period effects are controlling for age and, thus, represent influences that are independent of changes in age structure.

In Figures 5.7 and 5.8, the estimated cohort effects are plotted against their respective cohort groups. For cohorts born in 1881 through 1910, the coefficients are either close to zero or increasingly negative (b=0.11 through b=-1.00; λ=0.04 through λ= -0.85). Inspection of the respective t-ratios in Table 5.2 over these cohorts indicates that none of the unstandardized regression coefficients (b's) are statistically significant. However, the corresponding Z values in Table 5.3 indicate that the lambda values for cohorts born in 1891 through 1910 are statistically significant (but not for the 1881 through 1890 cohorts). Thus, it is inconclusive whether or not the increasingly negative coefficients found for these cohorts are significant.

Figure 5.7: Parameters for Cohort Effects, OLS Method.





Beginning with the 1911-1915 cohort, there is a statistically significant (t=-2.41; Z=-46.87) negative impact of cohort (b=-1.05; λ=-0.94) on fertility in Quebec: the 1911-1915 cohort had fewer children than the previous generation. The size of the negative coefficients remained relatively stable for cohorts 1916-1920, when cohort weakened in its negative impact on fertility until the 1941-1945 cohorts (b=-0.35; λ=-0.05). For cohorts 1946 to 1970, the b coefficients in Table 5.2 are increasingly positive, but statistically significant, beginning with the 1956-1960 cohort. In Table 5.3, the lambda values are also increasingly positive for these cohorts, and for this model, the coefficients are all statistically significant. These results indicate that in Quebec, cohort fertility decreased after a history of economic depression and increased with a history of economic prosperity (post-World War ll cohorts).

The distributions in Figures 5.7 and 5.8 indicate that for the oldest generations (C1 to C9) , the cohort effect is increasingly negative. For cohorts 10 to 13, the effect is decreasingly negative and, for the youngest cohorts (C14 to C18), the effect is increasingly positive. Interestingly, a U-shaped curve was also obtained for Canada by

Wright and Maxim, (1994).[3] They found the form of the curve surprising (Wright and Maxim, 1994:182) but do not explain why. When cohort effects are interpreted as socializaton for or against bearing children based on a past history of economic outcomes (hardship versus prosperity), a U-shaped curve makes sense. In this sense, socialization for fewer children resulted from economic depression and socialization for more children accompanied the economic prosperity of the late 1940s and 1950s.

In terms of the modernization thesis, these results imply that modernization affected fertility at specific times (period effects), but that the process of modernization did not coincide with change in intergenerational transmission of fertility (cohort effects). Cohort effects in Quebec coincide with changes in economic conditions typically called the depression era and the baby boom era. A history of economic deprivation theoretically resulted in socialization toward having fewer children, as evidenced by the decreasing effect of cohort on fertility. In contrast, a history of economic prosperity leads Quebec women to socialize their daughters toward having more children, as reflected by the increasingly positive effect of cohort on fertility.

This interpretation of the cohort effects is in accord with Easterlin (1969, 1973, 1975, 1980), who argues that fertility variations among cohorts reflect variations in the relevant preferences and/or constraints of those cohorts. Specifically, these preferences are shaped by "one's childhood and adolescent experience in one's own home with material affluence and family size. One reaches family-building age with preferences already molded by this heritage" (Easterlin, 1969:135). Although cohort effects contribute to an explanation of fertility change in Quebec, it should be kept in mind that cohort only explained 8 percent of the variance in Quebec's fertility, far less than either the age or period determinants.

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[3] It is interesting to note that although Wright and Maxim obtained similar results for Canada, they did so using a different technique. They analyzed the age, period, cohort effects using the 'conventional linear model approach', which involves a two-step procedure. The first step entails running an age-period regression on the transformed age, period, cohort specific rates. The second step involves regressing the cohort variables on the residuals generated by the age-period model.

At the broader level, these results suggest that the Quiet Revolution and modernization of Quebec involved both historical events captured by period effects and, to a lesser extent, intergenerational influences represented as cohort effects. It is possible that modernization in different populations may reflect only period influences, but the results for Quebec suggest that cohort can exert a separate impact on the process of modernization. For this reason, age, period and cohort models like the ones reported here, are useful in a theoretical understanding of modernization and fertility.

Although an age, period, cohort model describes important influences on fertility in Quebec, the data from both OLS and loglinear analyses indicate that most of the variance in fertility is due to age-period effects. For this reason, it is appropriate to focus on a decomposition analysis of the age-period effects in order to understand better the modernization process that occurred in Quebec in terms of its impact on fertility. Chapter 6 provides such an analysis.

CHAPTER 6: A Decomposition Analysis of Age-Period Effects on Quebec Fertility.

This chapter examines the demographic, social and economic factors that account for changes in the age specific fertility rates in Quebec from 1941 to 1991. Since the majority of births tend to occur within marriage, an analysis of fertility must take into account changing trends in marriage. In most developed countries, a decline in marriage rates has coincided with the decline in fertility. The decline in Quebec is particularly noteworthy. First marriage rates decreased in Quebec from 100.0 per 1000 unmarried individuals in 1951 to an all time low of 37.4 in 1994, (Bureau de la statistique du Quebec) compared to the Canadian decrease from 94.7 to 56.7, respectively (Statistics Canada).

Marriage rates have decreased largely because there are fewer gains to marriage, largely as a result of modernization, fluctuations in the economy and demographic change. Drawing on the literature, fewer gains to marriage can be explained by decreases in male economic resources, increasing female earning power, imbalanced sex ratios favouring unmarried males, and rising individualism in society. When there are fewer gains to marriage, fertility declines. Fewer gains to marriage also suppresses fertility by increasing marital instability and married female labour force participation.

The first section of the chapter presents a reconceptualization of Becker's concept of gains to marriage (Becker, 1981), which is given a broader interpretation by linking this concept to social psychological theories of social exchange. This analysis of gains to marriage is necessary in order to link the structural factors of the subsequent path analysis to marriage and fertility. It is important to show how economic, demographic and social structural factors work to alter the gains to marriage and, through this concept, increases or decreases the rates of marriage and fertility. Once the concept of gains to marriage is shown to have broader theoretical importance, the concept is used to explain the influences of sex ratio imbalances, modernization and market conditions on marriage and fertility. In the second section, the exchange theory of gains to marriage is operationalized in the context of a path analysis explaining fertility change in Quebec between 1941-1991.

6.1 A Theory of Social Exchange and the Gains to Marriage

An important problem in the demographic analysis of fertility is to explain how broad scale structural factors impact on individual decisions to marry and to have children. Consideration of the literature on this problem suggests that Becker's concept of gains to marriage may be useful, not only in a micro-economic analysis of marriage and fertility, but also as a concept that links additional demographic and social factors. Becker (1981) defines gains to marriage within an economic framework of comparative advantages where men and women are viewed as potential trading partners who come together to exchange their resources. As long as each party needs the other for valued resources, they will enter into marriage. Thus, the gains to marriage in Becker's theory are strictly economic and readily explain the effect of supply and demand conditions on marriage and fertility. However, as defined by Becker, the gains to marriage cannot conceptually link additional structural factors such as modernization and sex ratio imbalances to marriage and fertility.

It is possible, though, to view the concept of gains to marriage from a social exchange perspective (Blau, 1967; Homans, 1961;1974). Social exchange (as opposed to economic exchange) is conceptualized "as an exchange of activity [valued behaviour], tangible or intangible, and more or less rewarding or costly, between at least two persons" (Homans, 1961:13). Blau (1967) goes on to say that social exchange can be "observed everywhere once we are sensitized by this conception to it, not only in market relations, but also in friendship and even in love...as well as in many social relations between these extremes in intimacy" (p. 88). Thus, according to Blau, marriage may be viewed as a particular instance of social exchange.

An important principle of social exchange is that the partners will enter into exchange and continue to exchange with each other, only if both perceive a profit or gain from the relationship (Homans, 1961). Typically defined as rewards minus costs, profit or gain is based on an assessment of the rewards and the costs by each partner. Costs and rewards can be social, emotional and economic. Walster, Walster and Berscheid (1978) describe some of the rewards and costs in an exchange such as marriage. Perceived rewards include commitment, sexual fidelity, greater financial resources and a smooth operating household. In addition, marriage provides opportunities such as the chance to become parents. Waite (1995), in her Presidential Address, demonstrates that on average, marriage seems to produce substantial benefits for men and women in the form of better health, longer life, more and better sex, greater earnings (at least for men), greater wealth, and better outcomes for children (p. 499). She agues that four factors explain why marriage causes these outcomes: (1) the institution of marriage assumes a long-term contract, which allows the partners to make choices that carry immediate costs but eventually bring benefits; (2) marriage assumes sharing of economic and social resources and what we can think of as co-insurance against life life's uncertainties; (3) married couples benefit from economies of scale; and (4) marriage connects people to other individuals, to other social groups and to other social institutions which are themselves a source of benefits (p. 498). Conversely, perceived costs associated with marriage would include low commitment, sexual infidelity, financial difficulties and an inequitable distribution of day to day responsibilities (Walster, Walster and Berscheid, 1978). Moreover, opportunities forgone such as further education, pursuing a career and having alternative sexual partners may be additional perceived costs to a marital exchange.

Based on an assessment of such rewards and costs, each partner will either perceive positive or negative gains to marriage. If both partners perceive positive gains, they will be more likely to enter into marriage. If one or both partners perceive few gains to marriage, they will be unlikely to marry. In this assessment of the gains to marriage, it is important to note that the rewards and costs perceived by one partner do not have to be the same as those perceived by the other partner. The important point is that both partners must perceive positive gains in order for marriage to occur. Partners in a marital relationship continue to assess the rewards and costs of their marriage. As long as there are perceived positive gains, couples will remain married but, if the gains decrease for one or both partners, the probability of divorce increases (Levinger, 1979:184-5). Clearly, partners opt to leave the marital relationship when they no longer perceive any gain in continuing the marriage.

Structural changes in a society's economy, ideology and demographic composition can alter the perceived costs and rewards of marriage. Such changes may increase the perceived costs of marriage and decrease the perceived rewards, so that men and women find fewer gains in marriage than outside of it. For example, modernization opened up new opportunities for women to advance their education and pursue careers. To forgo such opportunities could be perceived by females as a substantial cost to being married. On the other hand, high male unemployment could increase the perceived costs of marriage for males due to the extra financial responsibilities of a wife and family. Thus, social, demographic and economic factors can influence the decisions to marry and to remain married by altering the perceived gains of marriage. Demographers have pointed to the economic, social and demographic factors that influence marriage and fertility. A social exchange view of gains to marriage can help integrate these diverse perspectives.

6.1.1 Economic Influences on the Gains to Marriage

Becker (1981) has argued that marriage rates will be high when single men and women perceive more economic gains by being married than by remaining single. Conversely, if unmarried men and women believe that they will be better off by remaining single, the perceived economic gains to marriage will be low, and marriage rates will decrease. Becker explains that because men and women represent potential trading partners, the economic gains to marriage are maximized with a sexual division of labour, involving women's provision of domestic services in exchange for economic support by men. However, this economic exchange becomes unnecessary when one of the partners cannot provide the services that the other requires (for instance, when there is high male unemployment) or if one of the partners finds alternatives for acquiring these services (such as female labour force participation). In either situation, there are fewer perceived gains to marriage, and marriage rates decline.

According to Easterlin (1980), the value of men as potential trading partners is largely dependent on the economy because economic constraints determine men's ability to 'assume the financial responsibilities for women and children that marriage entails' (Easterlin, 1980, in Espenshade, 1985:229). It can be argued, therefore, that during times of high unemployment, (such as during the depression and after 1970), the perceived gains to marriage are lessened for both men and women. Women gain very little by getting married if their domestic services are not compensated by their husbands' economic support. Consequently, when men experience economic difficulties, both single and married women have to find other sources of economic support. In a recent study, Goldscheider and Waite (1986) indicate that since the 1980s, due to few gains to marriage, women have pursued other options than marriage for financial support for themselves and their children in the form of paid employment and welfare systems.

Men are also less likely to perceive gains to marriage during economic hard times. During economic downturns, men feel financially insecure and, as a result, they tend to 'flee from marriage'(Easterlin, 1980). Thus, during times of hardship, the gains to marriage for men decrease due to the extra financial responsibilities of a wife and possibly children. However, during prosperous times, as they were immediately after World War II, men feel more financially secure and perceive little difficulty supporting a wife and family (Easterlin, 1980). As Trovato (1996) points out, male economic prosperity is associated with early marriage and increased marriage propensities (p. 3). Becker (1981) also argues that during times of prosperity, the economic advantage that men have over women increases in terms of wages, and they once again become viable trading partners in a marital exchange. If the exchange value between the services of men (economic) and women (domestic) is equitable, and both desire the services that the other can provide, the gains to marriage are positive and marriage rates will be high. However, if men experience economic hardships and/or women obtain economic independence, the potential exchange becomes inequitable, so that the perceived gains to marriage decrease. Under these conditions, marriage rates will be low (Becker, 1981).

This interpretation of the economic gains to marriage can explain changing marriage trends in Quebec. Before 1960, Quebec had a rigid sexual division of labour and consequently high marriage rates (see Chapter 2). With the advent of the Quiet Revolution and the coinciding women's movement, many women pursued advanced education and careers. Women in Quebec no longer had to rely on the traditional breadwinner system to gain economic security, with the result that the gains to marriage for women decreased. This was reflected in the substantial decline in Quebec's marriage rates since the 1960s. Marriage rates in this province also coincide with fluctuations in male unemployment rates. During the depression, when male unemployment rates were high, marriage rates decreased; and, in the period following World War II, when male unemployment rates were low, marriage rates increased.

The perceived economic gains to marriage not only affects the decision to marry, but also the decision to remain married. When there are few gains in remaining married, marital instability increases and divorce is a probable outcome. According to Heer and Grossbard-Shechtman (1981), "we should expect a higher divorce rate when the level of the wife's compensation [gains to marriage] is low than when it is high" (p. 55). The perceived gains to remaining married decrease if an imbalance in the economic exchange between spouses arises. For example, if husbands were to experience unexpected economic difficulties and could no longer sufficiently support their wives (assuming the marriage is based on traditional roles), married women would need to find alternatives for economic support, such as paid employment. As married women's earning power increases through paid employment, the economic advantage that men once had over women would diminish. This is in accord with Trovato (1996), who points out that when women acquire economic independence through labour force participation, they perceive marriage to have fewer economic or psychological rewards (p. 3). If the economic gains of remaining married for women substantially decrease, many women will opt to leave the marriage. Consequently, divorce rates increase.

Fertility can also be linked to the perceived economic gains to marriage and the gains to remain married. Easterlin (1973) found that fertility rates in the United States hit an all time low during the Great Depression (1933-1939) and then slowly increased until it reached a peak during the baby boom period. During the 1960s, fertility rates once again decreased and continued to do so throughout the 1970s (this pattern was very similar to the marriage rates). Easterlin interpreted fluctuations in the fertility rates as reflecting the economic status of young men: when men experience financial difficulties, married couples are less likely to have large families; when men's economic status is relatively high, couples will tend to have more children. Incorporating the gains to marriage concept with Easterlin's explanation, it can be argued that when men experience economic difficulties, there are fewer perceived gains for males to or remain married. As a result, there are fewer marriages and more divorces, both of which have a negative impact on fertility. Conversely, during times of prosperity, men perceive less costs in marriage and the gains to marriage and to remain married increase. More marriages and fewer divorces would raise the overall fertility.

High marital instability due to economic hardships also effects fertility, this by encouraging married women to find alternatives for economic support, other than their husbands, such as paid employment. As the earning power of women increases, they will be less likely to forgo their economic independence to have children. This inverse relationship between married female labour force participation and fertility is well substantiated in the literature. For example, Teachman and colleagues (1987) maintain that "smaller families are associated with greater labor-force participation among wives and, hence, financial independence" (p.18). Waite and Stolzenberg (1976) found that a woman's plans to participate in the labour force when she is 35 have a substantial effect on the total number of children she plans to bear in her lifetime. Rao (1987) points out that wive's labour force participation is positively associated with childlessness in Quebec and finds "the chances of being childless are as high as 76 per cent for the 15-24 age group who are in the labour force, compared to the women who are not in the labour force" (p.41). Thus, wives in the labour force are less financially dependent on their husbands, which decreases the value of men's economic exchange. Moreover, work provides social contacts for women and a self-identity outside that of being mothers and wives. As married women's earning power and social contacts outside of the home increase, the perceived gains traditionally found in marriage decrease. Consequently, there are more divorces and fewer children being born.

6.1.2 The Influence of Unmarried Sex Ratios on the Gains to Marriage.

The sex ratio theory was first developed by Dixon (1971), who argued that a decrease in marriage rates is due to substantial imbalances in the sex ratio of young adults. Guttentage and Secord (1983) further developed Dixon's ideas by incorporating social exchange concepts into their explanation. According to their theory, the gains to marriage are determined by imbalances in the unmarried sex ratio (the ratio of unmarried males in a population to the number of unmarried females in the prime marriageable ages of 20-34). If the sex ratio is above one, there are more unmarried men than unmarried women. According to Guttentag and Secord (1983)[1], the perceived gains to marriage for both men and women are maximized when sex ratios are high. If the sex ratio is below one, there are more eligible women than eligible men. This latter situation has often been referred to in the literature as the marriage squeeze (Akers, 1967; Veevers, 1994; Heer and

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[1] Most of this discussion, unless otherwise stated, is from Marcia Guttentag's and Paul Secord's 1983 book *Too Many Women? The Sex Ratio Question.* These authors are responsible for developing most fully the sex ratio theory.

Grossbard-Shechtman, 1981; Guttentag and Secord, 1983, South and Lloyd, 1992), meaning that "women are squeezed out of the marriage market because there are not enough potential husbands of a suitable age" (Veevers, 1994:172). When the sex ratio is low, there are fewer gains to marriage, especially for men.

An outcome of high sex ratios is a sexual division of labour where women's responsibilities are tied to the domestic realm and men's to the economic sphere. Their tasks are complementary but distinct. A woman's value is based solely on her attractiveness, her domestic skills and her abilities to produce and rear children. A man's value is based on his financial capabilities and his willingness to remain committed to the woman, especially through her childbearing years. There are many gains to marriage for both men and women when sex ratios are high. Since women would theoretically have plenty of choices for husbands, they can easily achieve socio-economic mobility through marriage. Gains to marriage for women also include low marital instability. Husbands are much more committed to their marriages, especially throughout their wives' childbearing years. Single women, due to their shortage, would be less likely to engage in premarital sex so the gains to marriage for men would include sexual relations and the opportunity to have children. Also because of the shortage of women, having a wife would be highly valued in itself and would enhance the status of men. Men "would want to possess a wife and would be willing to make and keep a commitment to remain with her...." (Guttentag and Secord, 1983: 19).

Conversely, when sex ratios are low, "the social, cultural and economic trends would, in some respects, be opposite to those of an undersupply" (Guttentag and Secord, 1983: 20). The gains to marriage would be low for both sexes, but more so for men. In terms of the gains for women in marriage, Heer and Grossbard-Shechtman (1981) argue that low sex ratios "reduces not only the number of women in the [traditional role of wife and mother] but also the benefits or compensation to be obtained [by women] pursuing it" (p.49). They define compensation as the monetary and other benefits that husbands give their wives in exchange for a combination of sexual, childbearing, childrearing, and household services (p.53). When there are more eligible women compared to eligible men, the compensation which men are obliged to give women for sexual companionship, without procreative intent, is reduced compared to the compensation necessary to secure the traditional combination of wifely and material services. This is because wives will accept less when sex ratios are low and the probability of husbands finding other wives is high. Less compensation by men also serves to reduce the proportion of single women who want to be engaged in that traditional role.

Men also would be less likely to marry because they would "have greater access to wifelike social and sexual services outside of marriage than they previously had, reducing their incentive to make longer-term commitments of financing and support. [...] As a result marriage may seem less desirable [for both men and women], and nonmarriage more reasonable" (Goldscheider and Waite, 1986: 92-93). Under these conditions, the status of women would be low in such a society since men would have the opportunity to move from woman to woman. "Sexual libertarianism would be the prevailing ethos, shared by men and women alike, although, because of the surplus of women, the options would be greater for men" (Guttentag and Secord, 1983: 20).

According to the theory, there would be more divorces, illegitimate births, sexual promiscuity (premarital sex and extramarital affair would be more acceptable) and lower degrees of parental investment in children when sex ratios were low. This is because men's commitment to women would be weak (Guttentag and Secord, 1983, 174). Committment is a perceived reward and infidelity a perceived cost for partners in marital exchange. The the assessed gains to marriage would be less for women under these circumstances. One possibility is that nonmarital cohabitation would become a viable alternative for young people. Moreover, women would be more likely to want to pursue economic independence, since socio-economic mobility through marriage would be perceived as extremely difficult under such conditions. Heer and Grossbard-Shechtman (1981) explain that a decrease in the gains to marriage for women (the decline in the wife's compensation) provoked by low sex ratios,

> served to increase the rate of divorce and the proportion of children born out of wedlock. The reduced proportion of women who were in traditional wifely roles, or who anticipated the future assumption of such roles, resulted in increases both in the proportion of females making use of the educational system to prepare seriously for a career and in the proportion of females actually employed (pp. 49, 62).

According to this theory, during sustained periods of low sex ratios, women also become more political, and various forms of feminism emerge in an attempt to change the gender imbalance of power. "A central theme would be the attempt on the part of women to establish themselves as independent persons in their own right" (Guttentag and Secord, 1983: 21). This would mean that fewer women will pursue the traditional and dependent roles of wife and mother.

Guttentag and Secord (1983) do not specifically connect sex ratios with fertility levels,[2] however it seems plausible to expect a positive relationship between the two. Thus, when sex ratios are high, one would also expect high fertility rates as a function of increased marriage levels, low divorce probabilities, and reduced participation of married females in the labour force. (Recall that under conditions of high ratios, societies tend to be traditional, marriage vows are honoured and divorce is highly unusual. Women's place is in the home and participation in the economic or political realms is highly discouraged). High sex ratios would effect fertility indirectly through marriage, divorce and married female labour force participation .

Conversely, when sex ratios are low, we would also expect fertility rates to be low because: (1) first marriages are postponed to later ages, (2) there is an increase in the proportion of women who remain single; (3) there is a larger pool of divorced women at any one time, and (4) there would be more divorced and widowed women who would not remarry (p.182)[3] . Women could no longer rely on potential marriage partners to support them economically and to remain with them through their childbearing years and, as such, they would be more likely to spend a good portion of their reproductive years pursuing education and careers. Heer and Grossbard-Shechtman (1981) argue that "the greater the marriage squeeze for females, the more fearful the wife will be that she will be abandoned by her husband and force to rear her children alone. The greater this anxiety, the less she will be motivated to want children" (p.58). Consequently, women under these conditions would be more likely to limit the number of children that they have or to even opt to remain childless.

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[2] In a discussion on the relationship between low sex ratios and illigitimate births, a decline in legitimate births is implied by the authors (pp.191-193).

[3] In their study on sex ratio imbalances in the United States, Scott and Lloyd (1992) found a statistically significant positive relationship between sex ratios and female marriage opportunities. More specifically, they found that the marriage squeeze (low sex ratios) limited women's marriage opportunities while increasing non-marital fertility and the probability of divorce.

6.1.3 Social Influences on the Gains to Marriage

The modernization theory of marriage decline focuses on the loss of functions that society expects families to perform as the modernization process advances (Espenshade, 1985; Westoff, 1983; Fuchs, 1983; Aries, 1980). As the number of functions decline, so do the gains to marriage because there are fewer valued activities to be exchanged. Westoff (1983) outlines several social changes thought to be related to the modernization process that account for the decline in the gains to marriage. These social changes are as follows: the erosion of traditional and religious authority; the growth of individualism, urbanization and the ideology of consumerism; the rise of mass education; increasing modern contraceptive technology; and, finally, a substantial increase in the equality and independence of women (Westoff, 1983:101). These social changes, according to this theory, have led to a loss in the economic, religious and educational functions that families once had. The only gains to marriage and the reasons that the family has persisted as a social institution is because of its two remaining functions, namely, reproduction and socialization (Westoff, 1983:102). However, Westoff concludes that the "future seems less and less compatible with long term traditional marriage" (p. 82), and he predicts that an extensive postponement of marriage will alter the family form as we know it (p. 79).

He also argues that the social changes brought about by modernization, which lead to fewer gains to marriage and, consequently, low fertility, is unlikely to ever reverse.

Fuchs (1983) argues that marriage has lost its appeal because individuals do not need to rely economically on the conjugal family any longer for the "production of essential goods and services (that is, the processing of food, making of clothes, education of children, child and elder care) and for financial and emotional support (for instance, providing social insurance for widows and orphans, the sick and the elderly) " (Fuchs, in Espenshade, 1985:235). Thus, many of the valued activities of marital exchange are removed and carried out by the market or by government, decreasing the perceived gains to marriage by both men and women.

Espenshade (1985), in his overview of this theory, suggests that the "growth in the earning power of women and the emerging economic equality between men and women" has undermined the institution of marriage as 'complementary economic exchange system' (p. 235). Westoff supports this idea, surmising that "such economic dependence for women would certainly have the effects of postponing marriage even further and of increasing considerably the opportunity costs of childbearing and child rearing" (Westoff, 1983:102).

Lesthaeghe and Surkyn (1988) elaborate on these ideas. In their view, the rise of modernization led to a rise in individualism which, in turn, negatively affected the gains to marriage by altering the perceived rewards and cost of the exchange. He argues that "the steep decline in marital fertility after the 1960s in the West ... [is a] recent indicator of the autonomous progression of an individualistically oriented Western value system; it coincides with the legitimization of cohabitation outside of marriage, voluntary childlessness, nonconformist sexual behaviour and abortion" (p. 412). In other words, as a society modernizes, individualism increases with a growing distrust of traditional institutions so that many of the activities related to marriage are no longer valuable to men and women.

The rise of secular individualism is particularly manifested in a decline in the influence of the Church, which consequently leads to a rejection of traditional family values (Lesthaeghe, 1983). According to Lesthaeghe (1983), "at least in the Western historical experience, without the more general secularization tendency ... fertility would have remained largely in the domain of the sacred instead of that of the freedom of individual choice" (p. 412). Thus, as religiosity decreases so, too, does the perceived gains to marriage and fertility because marriage itself is no longer highly valued. Aries (1980) also explains that the process of modernization leads to a rise in individualism. This process causes fertility to decline. The child, he claims, is no longer viewed as 'king' when individualism characterizes a society but, rather, is viewed as an 'obstacle' (Aries, 1980:650). This does not mean that children are no longer desired, but that the decision to have a child is based more on what the child means to the parents in terms their self actualization.

Preston (1987) explains that "as the costs of adherence to a particular value system rise, behavior increasingly departs from the ideal and eventually erodes the legitimacy of that value system" (p. 182). After the Quiet Revolution, a large number of Quebecois grew discontented with the Catholic Church. A substantial number left the Church entirely, whereas others abandoned the traditional Roman Catholic values and teachings. In fact, "Three-quarters of Quebec women below age 35 interviewed in a 1971 fertility survey disagreed with the Roman Catholic Church's ban on all artificial means of contraception" (Preston, 1987:182). Balakrishnan and colleagues (1984) found that "the overall nonuse of contraception among Catholics outside Quebec was higher when compared to nonuse of contraception among Catholics in Quebec" (in Rao, 1987:42). They conclude by observing that Quebec has transformed itself from a traditionally conservative society, under strong church influence with regard to reproductive and contraceptive behaviour, into a society in which fertility levels have reached unprecedented lows (in Rao, 1987:42).

An important aspect of this theory of modernization is that an ideational change takes place in a modernizing society, from one based on traditionalism and collectivism to one based on individualism. This transformation leads to more egalitarian gender roles and the pursuit of individual interests. From a social exchange perspective, the perceived costs associated with marriage under these conditions would increase due to fewer opportunites to pursue individual interests (for instance, the pursuit of education and careers), compared with alternatives like remaining single. Less perceived gains to marriage by men and women would lower fertility rates. And as societies modernize, most of the traditional functions of the family are taken over by other institutions, reducing the number of valued activities exchanged between men and women, and consequently, the perceived gains to marriage decrease for both sexes.

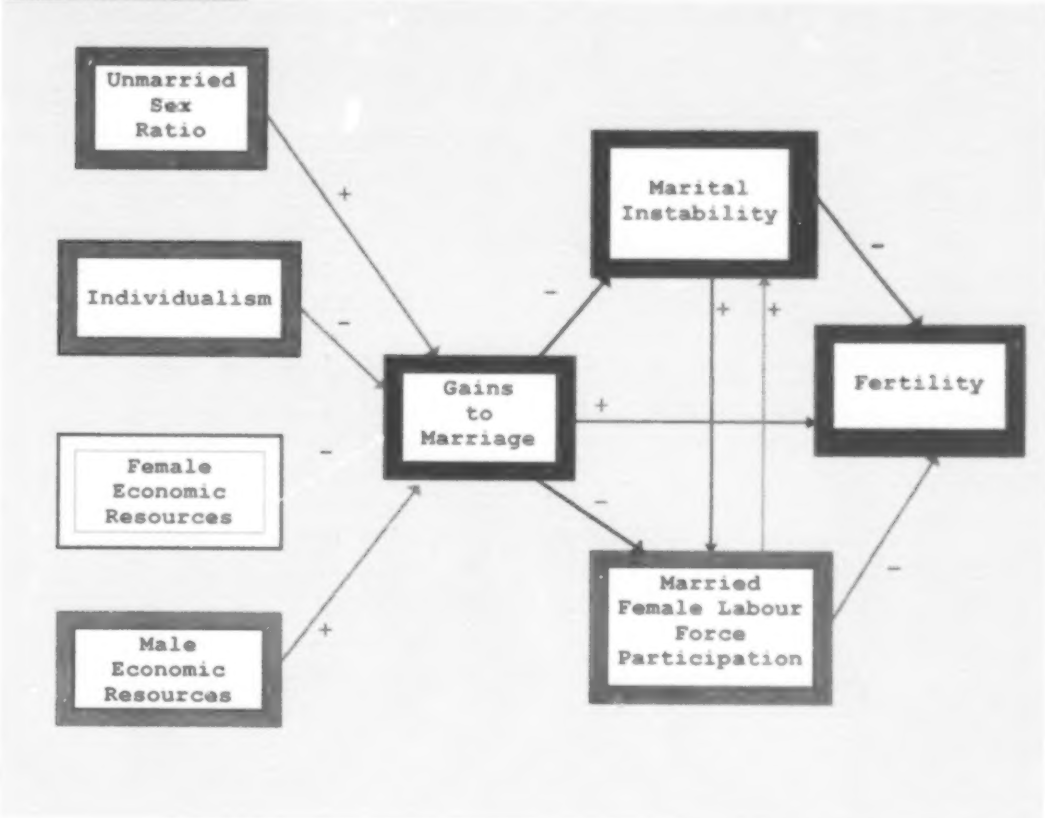
6.2 A Conceptual Model of the Determinants of Fertility Change in Quebec.

A theory of social exchange and gains to marriage suggests a model of fertility change in Quebec. Figure 6.1 indicates that changes in the perceived gains to marriage, marital instability and married female labour force (MFLF) participation directly effect fertility. Whereas the assessed gains to marriage is positively related to fertility, marital instability and MFLF participation are negatively related.

Married female labour force participation and marital instability also indirectly affect fertility. MFLF participation indirectly decreases fertility through its positive impact on marital instability. Accordingly, high MFLF participation causes marital instability, which has a negative impact on fertility. Conversely, low MFLF participation decreases marital instability and positively influences fertility. Likewise, high martial instability causes more married women to work in the labour force. Married women, with little security in their marriage (high marital instability), will want to remain employed during marriage since the likelihood of their marriage lasting is small. On the other hand, when marital instability is low, married women will be more likely to invest their time in unpaid labour. The gains to marriage for men and women also indirectly effects fertility through marital instability and MFLF participation. When the gains to marriage are high, marital instability and MFLF participation are low and fertility is high. Conversely, reductions in the gains to marriage sees high marital instability and MFLF participation and, consequently, fertility declines.

According to the previous theoretical ideas formulated in this chapter, the major factors that affect the perceived gains to marriage are demographic, social and economic.

Figure 6.1: Conceptual Model of Selected Determinants of Fertility Change, Quebec, 1941-1991.


Unmarried Sex Ratio
Individualism
Female Economic Resources
Male Economic Resources
Gains to Marriage
Marital Instability
Married Female Labour Force Participation
Fertility
+
−
−
+
−
+
−
+
+
−
−

The demographic factor is an imbalance in the sex ratio of unmarried males to females. Sex ratio is expected to be positively related to gains to marriage, for example, the higher the sex ratio, the higher the marriage rate. When the sex ratio is high (more males than females), gains to marriage are high and both men and women will choose marriage over other options. In contrast, when the sex ratio is low (more females than males), gains to marriage are low and remaining single or living common-law become viable options to marriage. Thus, the sex ratio indirectly effects fertility through its positive effect on gains to marriage.

The sex ratio also indirectly affects fertility through its effect on married female labour force participation. When sex ratios are high, the gains to marriage are high and MFLF participation is low. This is in accord with the theory of Guttentag and Secord (1983): High gains to marriage are indicative of a sexual division of labour where married women tend to work predominantly in the home rather than in the labour force, and this would have a positive effect on marital fertility. Conversely, when the gains to marriage are low due to a low sex ratio, there are fewer advantages to a sexual division of labour for females, so that more women are likely to enter the labour force. This development would have a negative effect on fertility.

Sex ratio can also indirectly affect fertility through its influence on marital instability. Drawing on Guttentag and Secord's (1983) theory, we would expect that when the gains to marriage are high due to a high sex ratio, there would be less marital instability, a function of higher commitment to marriage, especially on the part of men. Fertility rates would be high in this scenario. On the other hand, low sex ratios would tend to weaken the gains to marriage for both men and women (but more so for men), and a low marital commitment would increase marital instability, serving to reduce ultimately marital fertility levels.

In the conceptual model (Figure 6.1), a major determinant of the gains to marriage is modernization, represented as individualism. Modernization changes the orientation of a society, from one based on collectivism to one based on individualism. Rising individualism leads to rapid secularization of a society and the weakening of traditional values and belief systems (such as the abandonment of religion in people's lives). Secularization challenges 'established' institutions, like marriage and the family, which reduces the gains to marriage by decreasing the perceived reward value of activities in marriage. The result is a decrease in marriage and fertility rates. Modernization decreases the traditional functions that the family once performed, which further weakens the gains to marriage by reducing the number of valued activities exchanged in marriage. It follows that individualism indirectly effects fertility through its negative impact on the gains to marriage.

Individualism can also affect fertility through its indirect positive effects on marital instability and married female labour force participation. Growing individualism is a root cause of rising divorce rates and also married female labour force participation, both of which are inversely related to fertility. Davis (1987) maintains that divorce can effect fertility in the following ways. First, divorce tends to lessen the time that men and women spend in marriage. On average, 38% of the potential first-marriage duration is lost to divorce. Second, a high divorce rates indicate a high degree of marital instability.

Hence decisions about child-bearing, which necessarily involve long-term planning, must often be made in an atmosphere of apprehensive uncertainty. As a result, couples often postpone having a child, in which case divorce may intervene. Finally, a high divorce rate diminishes the financial security that a wife gets through marriage. Young women consequently work outside the home and seek more education as a means of upgrading their marketable working skills (p. 58). Davis (1987) also argues that it is the norm for divorce rates and married female labour force participation to increase as society modernizes, and that these phenomena can be attributed to a growing sense of individualism.

Drawing on the theories of the economic gains to marriage, it is expected that rising female and male economic resources will have different effects on perceived gains to marriage for men and women. When male economic resources (male earning power) are high, gains to marriage will be high for both men and women and, consequently, marriage and fertility will rise. High economic resources could also indirectly decrease marital instability which would positively influence fertility (Easterlin, 1980; Openheimer, 1979, 1996). Along the same lines, when male economic resources are high, there would be little need for women to work after they were married; they would be fairly compensated for their domestic services. When male economic resources are low (such as they are during times of high unemployment), perceived gains to marriage should be low for both men and women. In these circumstances, women will find males with low economic resources to be less desirable as trading partners than males with high economic resources (Becker, 1981). Males with low economic resources will also be more reluctant to marry due to the extra costs associated with supporting a wife and, possibly, children. In addition, the combination of both male low economic resources and fewer gains to marriage increases marital instability. It also increases the likelihood of married women entering the labour force to pursue their own independence or to compensate their husbands' weak economic support. Increases in both married female labour force participation and marital insecurity decreases fertility.

According to the theory of the economic gains to marriage, it would be expected that female economic resources (female earning power) would be inversely related to gains to marriage. Recall that gains to marriage are maximized with a sexual division of labour. Therefore, perceived gains of marriage should be high when female economic resources are low, indicating that women's work was primarily within the home rather than in the labour force. Conversely, gains to marriage will be low when female economic resources are high, indicating that more women are participating in paid labour. The rising earning power of women is inversely related to fertility by reducing the gains to marriage, which increases both married female labour force participation and martial instability (Becker, 1981). It is expected, therefore, that high female economic resources will indirectly increase marital instability and married female labour force participation through its negative impact on gains to marriage. High female economic resources or earning power increases the value of time spent at domestic duties and, from this, increases the likelihood that women will continue to work after marriage. Divorce also becomes more attractive when the gains to marriage are weak due to high female economic resources. High marital instability decreases fertility.

6.3 Data

The dependent variable in this study is a tabulation of the age specific fertility rates as recorded in Vital Statistics publications for Quebec between 1931-1991 (Statistics Canada, *Births*, 1931-1991). In order to test the effects of the various relationships in Figure 6.1, several variables were selected to represent quantitatively the various concepts included in the path model. Except where stated, the age-specific data for the predictors of fertility was obtained from the Censuses of Canada for every 5 years from 1931 to 1991. Both year and age are included in the analysis to control for the time trend and the age composition in fertility rates. The age groupings are as follows: 20-24, 25-29, 30-34, 35-39 and 40-44. The age groups 15-19 and 45-49 have been omitted from the analysis due to their relatively low contribution to overall fertility. The years 1931 and 1936 were omitted from the model because preliminary analysis indicated that these two years were highly correlated with most of the predictors.

The proportion of the married female population between the ages of 20-44 who were divorced at the time of the Census was chosen as a measure of marital insecurity. Age specific divorce rates would have been preferred, but these data are only available after 1971. This limitation in the data necessitated the use of prevalence measures. Quebec was not included in the 1946 Census, so data were unavailable for this year. Thus, a third order polynomial curve was fit to the existing divorce data and the function from this curve was used to estimate the data for 1946. When a relatively high proportion of the female population is divorced, this is a reflection of weak commitment to marriage, and confidence in marriage as a life long partnership is generally low. Consequently, couples will be more likely to limit their fertility. Depending on its timing, divorce can considerably shorten a woman's reproductive years, making high fertility less possible. Conversely, when divorce is low for women in their reproductive years, marriages are relatively stable and fertility is relatively high.

Married female labour force participation is measured as the proportion of married women who were employed at the time of the census and is expressed per 1000 married women. Although the Canadian Census reported the number of employed married women by five year age groups for 1981 and 1991, the data were coded in the published tables for ten year age groups for the remaining census years. The exceptions to this were for the 20-24 year age group, recorded for all years, and for the years 1946 and 1956, when this variable was not measured at all. Thus, the Public Use Sample Tapes (individual files) were used to estimate the data for the five year age groups in 1971, 1976 and 1986. For 1941, 1951, 1961 and 1966, the ten year age groups were broken down into five year age groups using the 1971 age-specific data as the basis for disagregation. To obtain estimates for the years where no data was available (1946 and 1956), a third order polynomial function was used.

As indicated earlier, the relationship between married female labour force participation and fertility has received wide attention in the literature (Beaujot, 1990, McQuillan, 1986, Ursel, 1986, Davis, 1984, Keyfitz, 1986). Teachman, et al., (1987) states that one of the "most cited consequences of female employment is that it reduces fertility" (p. 12). Micro-economists argue that the decision to have a child involves the assessment of the costs and benefits involved. The costs, which include forgone income for wives, are weighed against the material and psychic benefits of having a child. Fertility declines in Western industrialized countries are thus not unexpected since the costs of having children have been increasing over the last four decades.

Age-specific female marriage rates are used as a proxy measure of the gains to marriage. An unpublished tabulation provided by 'Bureau de la statistique du Quebec' containing Quebec's age-sex specific marriage counts for 1951 to 1991, was transformed into rates by dividing the number of female age specific marriages by the corresponding unmarried age specific female populations. For the years 1941 and 1946, the age specific marriage counts for females were obtained from published Vital Statistics tables. Rates were calculated as above. Age specific marriage rates are thought to reflect gains to marriage in that high marriage rates indicate positive gains and decreasing marriage rates indicate a decline. This is in accord with the theories presented earlier.

The predictors of the gains to marriage include the unmarried sex ratio, individualism, female economic resources, and male economic resources. The unmarried sex ratio is the number of age specific unmarried males (20-44) to the number of age specific unmarried females (20-44), where unmarried includes the never married, widowed and divorced. A high ratio (above 1.0) indicates a surplus of unmarried males, while a low ratio (below 1.0) indicates a surplus of unmarried women.

Four variables were selected as indicators of individualism: (1) the proportion of men that report "no religion" when asked for their religious affiliation in the Census; (2) the proportion of women that report "no religion" in the Census when asked for their religious affiliation; (3) female post-secondary education; (4) male post-secondary education; and (5) urban residence. The "no religious" affiliation variable is only recorded every ten years by the Census, therefore, exponential interpolation was used to derive estimates for the intercensal years of 1946, 1956, 1966, 1976 and 1986.

Male and female post-secondary education variables in the Censuses were recorded in ten year age groups rather than by five year groups for the years of 1941, 1951 and 1961. To obtain rates for five year classes, estimates were derived using the 1971 rates as the basis. Because these variables were not measured for 1946, 1956 and 1966, estimates were obtained by fitting the observed data to a simple regression line (a simple linear function was found to best fit the data graphically for the years 1941 to 1966). The urbanization data were recorded in the published Census tables for all years by five year age groups except in 1946; therefore, exponential interpolation was used (after an exponential curve was found to have the best fit of the observed data) to disagregate the ten year age groups for this year.

These five variables, (male and female "no religious" affiliation, male and female post-secondary education and the urbanization rates for the sexes) were analyzed with an R-factor analysis program in SPSS, which is based on correlations between the variables. A function of factor analysis is to identify factors that are independent of one another. The factor analysis done here used the Varimax method with orthogonal rotation. Results from the factor analysis, after one iteration, identified that these five variables loaded strongly on Factor 1 (see results in Appendix A)[4]. The computed factor scores were saved and used in the multivariate analysis as a proxy measure for the individualism concept.

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[4] Male unemployment rates and the female to male income ratio were also included in the factor analysis. The results indicate that they both load on factor 2. After preliminary analysis, it was decided to enter

Economic influences on the gains to marriage include male and female economic resources. According to the literature, the gains to marriage are maximized when there is a sexual division of labour, whereby men trade their economic resources for the domestic services of women. The gains to marriage decrease when men experience economic difficulties due to fluctuations in the market or when the earning power of women increases. In both cases, men and women lose the competitive advantage that they once had over the other, and there are no longer advantages to maintaining a sexual division of labour. Consequently, the gains to marriage decrease. Male unemployment rates and female-to-male average income ratios were chosen as measures of these concepts. It is expected that the economic gains to marriage will be highest when both male unemployment rates and female-to-male average income ratios are low. Conversely, when male unemployment rates and/or the income ratios are high, the gains of marriage should be low. In addition to its effect on marriage rates, male unemployment is also allowed to effect fertility indirectly through married female labour force participation. Extant analysis points out that married women are often pulled into the labour force during hard times (Pryor, 1984; Armstrong, 1990; Rashid, 1986). Thus, while it is possible for the gains to marriage to be high, temporary fluctuations in the economy might make it necessary for married women to work until such time that husbands' average income recovers. Even though employment may be temporary, it could still limit fertility.

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these two variables separately into the model, rather than as one factor, because it is theoretically expected that these two variables should have opposite effects on gains to marriage.

The unemployment variable is measured by the unemployment rate[5] for the years 1971 to 1991, and by the proportion of the population that reported that it was unable to find work for the earlier years (1941-1956). The use of these two series was necessitated by the fact that a consistent uniform measure of unemployment is unavailable for the 60 years encompassing this analysis. It was determined graphically that there is a gradual upward movement over time in both series. Although not strictly identical, their similarity in trend over time, and the constraint of not having a unified measure over the complete study period, necessitated that the two series be treated as one variable. These data are not available for 1946, 1951, 1956, 1966, 1976 and 1986. Therefore, to obtain figures for 1976 and 1986, population unemployment estimates were calculated by using the unemployed distributions in the Public Use Sample data. To obtain estimates for the remaining years, a third order polynomial function was used. For men 25 years and older, the data was recorded by ten year age groups for 1941 and 1961. The 1971 rates by five year age groups was used as the basis to break down the ten year age into five year age classes.

The female to male average employment income ratio is the age specific average female employment income divided by the age specific average male employment income. The age-specific average income for each period in this analysis was standardized using the 1991 Consumer Price Index. The income data was recorded by the Censuses in ten year age groups. For 1971 to 1991, population estimates by five year age groups were calculated by weighting the sample data from the Public Use Sample Tapes in the same manner as indicated earlier in connection with the unemployment variable. For the remaining years, the age groups were broken down into five year age groups by using 1971 as a standard. To obtain estimates for the years that data were not recorded (1946, 1956 and 1966), an exponential function was used.

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[5] This unemployment rate was calculated by the number of age-specific unemployed males per 1000 age specific males in the labour force.

6.4 Method of Analysis

To estimate the specified paths in Figure 6.1, four regression models were fitted to the data. The first equation included regressing divorce, married female labour force participation (MFLF) and female marriage rates on the age-specific fertility rates. The second regressed sex ratios, individualism, female-to-male income ratios and male unemployment rates on female marriage rates. These equations were computed using Ordinary Least Squares (OLS) regression with SPSS.

Because there is reciprocal causation between married female labour force participation and divorce, ordinary least squares regression could not be used for the other two equations (Namboodiri, Carter and Blalock, Jr., 1975:492-532). The feedback relationship between the proportion of women who are divorced and married female labour force participation produces correlations between the error term of the predictor and the variable being treated as the dependent variable. Correlation of the error term with one of the predictor variables violates one of the assumptions of regression analysis and leads to biased coefficients (Norusis, 1993:236). Two-stage lease squares regression is a more appropriate technique for models with recursive causation. In order to regress married female labour force participation and female marriage rates on divorce, the following two steps were employed. First, female marriage rates and male unemployment were regressed on divorce. The predicted values from this equation were saved in a new series named 'new divorce'. The second stage involved estimating the part of the model where the dependent variable was married female labour force participation. In order to do this, the variable 'new divorce' was substituted for the variable 'divorce'. In other words, 'new divorce', male unemployment rates and female marriage rates were regressed on married female labour force participation. A similar procedure was done in order to calculate the coefficients leading to divorce. The first stage involved regressing female marriage rates and male unemployment rates on married female labour force participation. The predicted values from this equation were saved in a new series named 'New MFLFP'. 'New MFLFP' and female marriage rates were regressed on divorce. Standardized coefficients (β's) from all four regression models were used to calculate the path coefficients (P's).

Path analysis is a method that allows the simple correlations among the variables to be partitioned into direct and indirect effects. At the least, an assumption of path analysis is the existence of a weak causal order among the variables (which have been described). The fit of the path model can be assessed from the $\sqrt{1} - R^2$ coefficient of each model, which may be interpreted as the proportionate reduction in error in predicting the dependent variable from knowledge of the independent variables operating jointly.

A path diagram shows the causal structure of the variables. An arrow from one variable to another indicates a direct path. If an arrow connects one variable to another, and the latter variable is connected by an arrow to a third, the path is said to be indirect.

To calculate indirect effects, the product of the direct path coefficients is used. The path coefficients are standardized such that the range of each term is between -1 and +1; thus, the larger the value of the coefficient, the greater the impact of that variable either negatively or positively.

6.5 Results

Table 6.1 shows the direct and indirect effects, and Figure 6.2 presents the path coefficients that were statistically significant at the .05 level.[6] The results demonstrate that female marriage rates (*P*=.44), the proportion of divorced females (*P*=-.13), and married female labour force participation (*P*=-.58) had significant direct effects on age specific fertility rates. These coefficients indicate that high marriage rates, low married female labour force participation and low female divorce directly increase fertility rates in Quebec. Conversely, low marriage rates, high married female labour force participation and high proportion of divorced females decrease fertility in the province. An overall R^2 of .96 was obtained when these three factors, age and year were regressed on fertility. Female marriage rates (R^2=.58), MFLF participation (R^2=.13), and divorce (R^2=.006) explain 72 percent of the overall variance. Age and year account for the remaining 28 percent.

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[6] It should be noted that the obtained Durbin Watson statistic for all the equations, with the exception of divorce, were above the specified lower limit at .01 significance, indicating that the null hypothesis of zero autocorrelation in the residuals should not be rejected (see Table D-5C, in Jan Kmenta's *Elements of* Econometrics, 2nd edition, 1986,p.768). However, the value of the test statistics were not above the specified upper bound. Thus, the test is inconclusive and we cannot be statistically certain that the errors are not correlated. However, when differencing was used on the data, the Durbin Watson statistics did not differ that much, suggesting that autocorrelation is minimal. Moreover, a visual inspection of the residuals were also done to check for autocorrelaton. The equation where divorce was the independent variable, produced a Durbin Watson statistic just below the recommended minimum limit suggesting that autocorrelation may be present in this equation.

As shown in Figure 6.2, female marriage rates, MFLF participation and divorce[7] also had indirect effects on fertility. MFLF participation had an indirect effect on fertility through divorce (*P*=-.08), increasing its total effect to -.66. Similarly, the indirect effect of divorce on fertility through MFLF participation is -.23, giving an overall effect of -.36. Female marriage rates indirectly effect fertility through both female divorce and married female labour force participation. Marriage rates have a total effect of .72 after the total indirect effects (*P*=.278) are combined with the direct effect (*P*=.44). Therefore, female marriage rates has the strongest total effect on fertility (-.72); followed by MFLF (.66) participation and finally, divorce (-.36).

In terms of the predictors of marriage rates, unmarried sex ratios, individualism and female-to-male income ratios had significant direct effects and, along with age and year, explained 90 percent of the variance in the marriage rates. Unmarried sex ratios had the largest direct effect on female marriage rates (P=.59; $\sqrt{1-R^2}$ =.63), indicating that marriage rates are highest when there is a surplus of eligible males and lowest when there is a surplus of eligible females (the marriage squeeze). Individualism had the next strongest effect on female marriage rates (P=-.41; $\sqrt{1-R^2}$=.48). This finding indicates that individualism is inversely related to marriage so that high individualism reduces marriage rates.

Unexpected results were obtained for the economic variables. The results for (female-to-male) income ratio show that increases in women's average income, relative to

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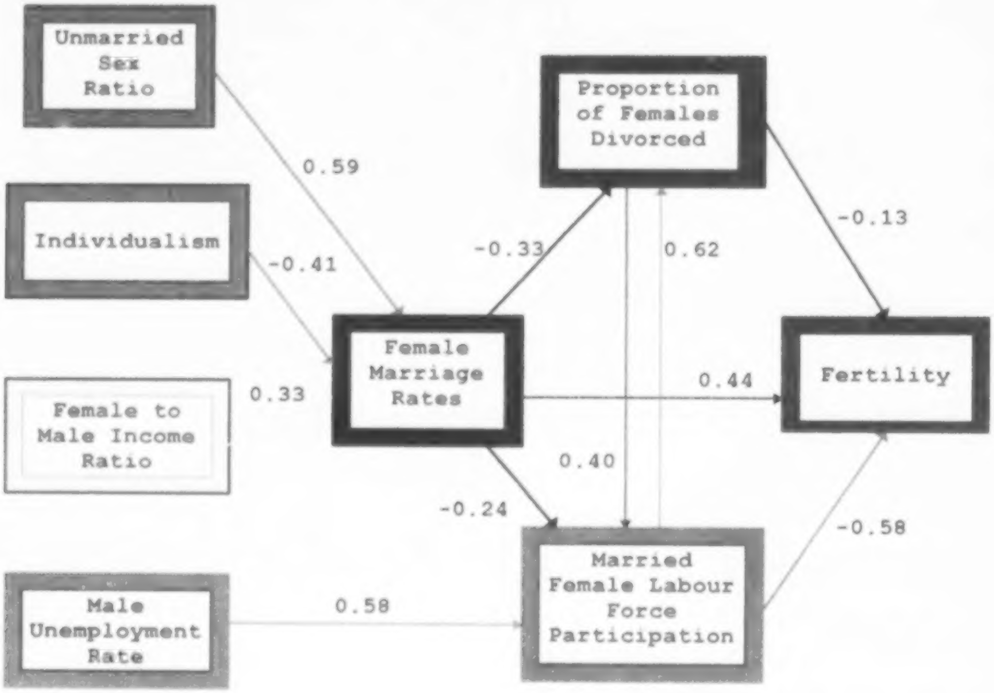
[7] Regressing female marriage rates, MFLF participation, age and year on divorce was more problematic than the other equations. The youngest age group (20-24) was highly correlated with MFLF participation and as a result, a reversal in the sign of the coefficient occured. In order to address this problem of collinearity, two regressions were done: one including this age group and then another where the age group was removed. The results reported are from the equation that removed this age group.

Figure 6.2: Observed Model of Selected Determinants of Fertility Change, Quebec, 1941-1991.


Unmarried Sex Ratio
Proportion of Females Divorced
0.59
Individualism
-0.41
-0.33
0.62
-0.13
Female Marriage Rates
Fertility
0.33
Female to Male Income Ratio
0.44
0.40
-0.24
-0.58
Married Female Labour Force Participation
Male Unemployment Rate
0.58

Note: age and period effects were included as additional regressors for each equation, but are not shown here.

Table 6.1 Indirect, Direct and Total Effects on Fertility.

Variables	Indirect and Direct Effects	Total Effects
Marriage-Fertility	0.440	
Marriage-Divorce-Fertility	0.043	
Marriage-MFLFP-Fertility	0.139	
Marriage-Divorce-MFLFP-Fertility	0.077	
Marriage-MFLFP-Divorce-Fertility	0.019	
Total Effect of Marriage on Fertility		0.718
Divorce-Fertility	-0.130	
Divorce-MFLFP-Fertility	-0.232	
Total Effect of Divorce on Fertility		-0.362
MFLFP-Fertility	-0.580	
MFLFP-Divorce-Fertility	-0.081	
Total Effect of MFLFP on Fertility		-0.661
Sex Ratio-Marriage-Fertility	0.260	
Sex Ratio-Marriage-Divorce-Fertility	0.025	
Sex Ratio-Marriage-MFLFP-Fertility	0.082	
Sex Ratio-Marriage-Divorce-MFLFP-Fertility	0.045	
Sex Ratio-Marriage-MFLFP-Divorce-Fertility	0.011	
Total Effect of Sex Ratio on Fertility		0.423
Individualism-Marriage-Fertility	-0.180	
Individualism -Marriage-Divorce-Fertility	-0.018	
Individualism -Marriage-MFLFP-Fertility	-0.057	
Individualism -Marriage-Divorce-MFLFP-Fertility	-0.031	
Individualism -Marriage-MFLFP-Divorce-Fertility	-0.008	
Total Effect of Individualism on Fertility		-0.294
		Continued...

Table 6.1 Continued Variables	Indirect Effects	Total Effects
Income Ratio-Marriage-Fertility	0.145	
Income Ratio-Marriage-Divorce-Fertility	0.014	
Income Ratio-Marriage-MFLFP-Fertility	0.046	
Income Ratio-Marriage-Divorce-MFLFP-Fertility	0.025	
Income Ratio-Marriage-MFLFP-Divorce-Fertility	0.006	
Total Effect of Female to Male Income Ratio on Fertility		0.236
Male Unemployment-Marriage-Fertility (Not Significant)	-0.070	
Male Unemployment -Marriage-Divorce-Fertility (Not Significant)	-0.007	
Male Unemployment -Marriage-MFLFP-Fertility (Not Significant)	-0.022	
Male Unemployment -Marriage-Divorce-MFLFP-Fertility (Not Sig.)	-0.012	
Male Unemployment -Marriage-MFLFP-Divorce-Fertility (Not Sig.)	-0.003	
Total Effect of Male Unemployment on Fertility (Not Significant)		-0.114 (NS)
Male Unemployment- MFLFP-Fertility	-0.336	
Male Unemployment- MFLFP-Divorce-Fertility	-0.047	
Total Effect of Male Unemployment on Fertility (Significant)		-0.497

males, increases marriage rates (*P*=.33; $\sqrt{1 -R^2}$ =.30). That is, as female earning power goes up, so do marriage rates in the province of Quebec. Although male unemployment had a negative effect on female marriage rates (*P*=-.16), the result was not significant at the .05 level (p=.07). Yet, male unemployment did have a significant positive effect on married female labour force participation (*P*=.58). High male unemployment rates lead to more married women employed in the labour force. Married women enter the labour market in increasing numbers when males experience layoffs and difficulties holding jobs.

In terms of the indirect effects of demographic, economic and social factors on fertility, male unemployment had the strongest indirect effect through MFLF participation (*P*=-.50). That is, male unemployment increases MFLF participation and, the greater the participation of females in the economic market, the less their fertility. Individualism also had an indirect negative effect (-0.29) on fertility. Most of the indirect effect on fertility is through individualism's negative impact on marriage rates and marriage rates positive relationship to fertility (*P*=.18). The unmarried sex ratio also had an indirect effect on fertility through the marriage rate (*P*=0.26), with a total indirect impact of 0.42. As the sex ratio of males to females declined in Quebec, marriage and fertility rates also declined. Finally, the female to male income ratio had an indirect positive (0.24) effect on fertility, with most of the indirect effect (0.15) coming via the impact of marriage rate on fertility. As female earning power increased, marriage rates increased and age-specific fertility lessened in the province of Quebec.

6.6 Discussion

Fertility changes in Quebec from 1941 to 1991, were due to changes in divorce, female labour force participation and female marriage rates. Divorce and married female labour force participation had an expected negative impact on age-specific fertility. In this analysis, however, the most profound influence on fertility was changes in marriage rates. When marriage rates increased, fertility rates also climbed, and when the rate of marriages decreased, fertility declined. This finding is in accord with Caldwell, Fréchet, and Thibault (1993) who found a strong positive relationship between female marriage rates and total fertility rates in Quebec between 1961 and 1989.

Given the strong influence of female marriage rates on fertility, the path analysis provided a structural account of the demographic, social and economic factors that determine changes in marriage rates in Quebec. Interestingly, the unmarried sex ratio had the largest positive influence on female marriage rates. This indicates that marriage rate responds to changing demographic composition of the unmarried population. When there were more eligible males in Quebec than eligible females, the perceived gains to marriage for both genders were high and marriage rates increased. However, when Quebec experienced low sex ratios, as it has in the past few decades, the gains to marriage weakened and marriage rates declined. This finding is consistent with the more general theory of sex ratio imbalances and the evidence reported by Veevers (1994) for Canada and by Guttentag and Secord (1983) for the United States. The marriage squeeze also indirectly increased divorce and married female labour force participation, and these conditions contributed to lower fertility in Quebec. Although not well discussed in the demographic literature on Quebec, unmarried sex ratio apparently is an important direct determinant of marriage and also an indirect determinant of fertility change in this province.

An important finding, and one central to this analysis, is the negative impact of individualism on female marriage rates. Individualism represents the influence of modernization on Quebec society. Modernization weakens the gains to marriage by shifting functions normally subsumed under family and marriage to other sectors of the society, reducing the reward value of marital activities and the number of these activities. The negative relationship discovered between individualism and marriage rates is not unexpected from the point of view of the modernization thesis. One possibility for the substantial decline in fertility in recent years may be the indirect effect of individualism on women's choices to have children. That is to say that as Quebec modernized gradually over time, and more intensively during the Quiet Revolution, people increasingly adopted an individualistic orientation to life and a distrust for traditional institutions such as church and marriage (Aries, 1980; Lesthaeghe and Surkyn, 1988). Concomitantly, alternatives to marriage, such as cohabitation, have gained in popularity and marriage rates have declined (Langlois, et al., 1992: 111). As shown here, rising individualism and lower marriage rates decreased fertility in Quebec.

Individualism has also had a negative impact on Quebec's fertility through its indirect effects on divorce and married female labour force participation. As individualism increased, marriage rates declined, increasing the proportion of females who divorced and the number of women who entered the labour force. Thus, individualism has had a substantial indirect impact on fertility in Quebec through its influence on marriage, divorce and labour force participation of married women. This finding accords with the modernization thesis and clarifies how individualism effects fertility. In the present model, the impact of individualism is assumed to operate through its effect on perceived gains to marriage as elaborated earlier in this study.

Finally, the path analysis examined the influence of economic factors on marriage and fertility in Quebec. Both economic variables -- male unemployment and female-to-male income ratio -- showed unexpected results. Male unemployment had no significant relationship to female marriage rates. The negative path coefficient is, however, in accord with the hypothesis that low male economic resources decrease the gains to marriage. However, consistent with the Easterlin thesis, male unemployment rates did have a strong indirect negative impact on fertility in Quebec through their positive effect on married female labour force participation. As male unemployment rate increased, married women entered the labour market in greater numbers and fertility declined. The effects of male unemployment rate on married female labour force participation also had a positive effect on divorce which, in turn, reduced fertility. Through these indirect effects, male unemployment is the strongest overall determinant of fertility change in Quebec between 1941 and 1991. This result is compatible with economic analyses of fertility (e.g., Easterlin, 1980; Waite, 1981; Oppenheimer, 1979,1994) showing that male economic difficulties force married women into the labour force thereby reducing their overall fertility.

Surprisingly, female earning power (female-to-male income ratio) had a positive effect on female marriage rates: as female earning power increased, so did marriage rates. This result is unexpected only when female trading power is assessed in terms of the domestic activities. When female earning power is viewed as a contribution to marriage, the result makes sense. In other words, women's earning potential may have become viewed as a positive reward for marriage by Quebec males in that it contributed to household utility. This is especially the case when it is considered that women continue to provide domestic labour, but have added the extra economic benefit of high earning power (Armstrong, 1990). Apparently in Quebec, increased earning power is valued by both men and women because couples can avoid economic hardships and/or increase their standard of living. In fact, Armstrong (1990) concludes from her analysis on Canada, that "poverty in husband-wife families would have increased by at least 50 percent if women had not entered the labour force" (p. 76).

Female earning power also has an indirect effect on fertility. That is, as female earning power increases, men and women find more gains in marriage, with resultant higher fertility. One possibility is that increases in the earning power of both men and women in Quebec contribute to higher fertility. This hypothesis is consistent with the findings by Caldwell, Fréchet and Thibault, (1993), who reported that average personal income had a positive effect on Quebec's total fertility rates. Generally, economic contributions by both males and females are important determinants of fertility trends in the province. In the present case, these income factors work indirectly on fertility by altering the gains to marriage. However, increasing female participation in the labour force has a stronger and negative effect on fertility, thereby reflecting the hypothesized causal relationship adumbrated by Butz and Ward (1979): as women participate more in economic activities, their opportunity costs for childbearing increase substantially, leading overall to reduced fertility.

The decomposition analysis of fertility in Quebec has shown that there were economic, demographic and social influences on both marriage and fertility. These structural conditions affect fertility by altering the perceived gains to marriage. As gains to marriage increased, divorce became less frequent, women worked in paid labour less and fertility increased. This situation is a thing of the past; in Quebec society today, the gains to marriage are low, divorce and married female labour force participation have increased, and fertility has declined to very low levels.

Chapter 7: General Discussion of Fertility Trends in Quebec.

7.1 Modernization and Fertility in Quebec.

Historically, fertility has been central to the survival of French Canadian culture in Quebec. Recently, the province has gone from having one of the highest fertility rates in the world to having one of the lowest. These changes in fertility have coincided with the socio-economic transformation of Quebec society that took place gradually over time, and more intensively during and after the Quiet Revolution of the 1960s. Before the Quiet Revolution, Quebec maintained high fertility due to the substantial influence of the Catholic Church and the pronatal policies of the provincial government. Women were educated toward domestic activities, encouraged to marry young and to have large families. Economically, Quebec was a rural society, largely untouched by the industrial revolution that had already occurred in the rest of Canada.

The Quiet Revolution was an attempt on the part of Quebec to catch up with the rest of Canada in terms of modernization. Throughout the next three decades, the province transformed from a traditional, rural society to a modern industrial state. As part of this transformation, the control of education was removed from the Church as schools were placed under the secular regulation of government. Where once individuals were discouraged from pursuing education or personal gain, they were now encouraged to advance their education and actively engage in productive labour for a capitalist economic system. The overall result of this process of modernization has been a gradual rise in individualism and a corresponding decline in traditional institutions such as marriage and religion. Cohabitation, divorce, and married female labour force participation have been rising accompanied by a staggering decline in fertility. At the present time, it is still questionable as to whether the province will be able to bring its fertility levels back to replacement levels, not withstanding government efforts to do so.

This thesis has focused on the demographic, economic and social factors that determined fertility change in the province from 1931 to 1991. To show the impact of modernization on fertility, an age-period-cohort analysis was undertaken. Not surprisingly, this analysis indicated that much of the variation in fertility is accounted for by age, describing the fact that fertility peaks for women in the 25-29 year age group and then decreases until menopause. But, in addition to the age effects, both cohort and period were found to help explain fertility change in Quebec. Cohort effects, although relatively minor, were interpreted as reflecting the impact of socialization from one generation of women to the next on women's tendency to have large or small families. The pattern of results indicated that cohort effects coincided with economic depression and prosperity in the province of Quebec, rather than with the diffusion of values characterizing the Quiet Revolution and modernization. Socialization for or against large families reflects a history of economic conditioning that is socially transmitted from one generation to the next. Cohorts who have experienced hard times tend to train their children (either explicitly or in complex and subtle ways) to reduce their fertility. Conversely, cohorts who have experienced more prosperous times tend to socialize children for larger families. Traditionally, Quebec has maintained pronatal values and evidence suggests that the province continues to do so (Caldwell and Fournier, 1987; Maroney, 1992). Cohorts of women tend to curtail their fertility after a history of economic hardship, but once prosperity returns, fertility can rise in the preferred direction.

Period (particularly the years 1931-1991) is a moderate predictor of fertility change in Quebec, accounting for more of the explained variance in fertility than cohort but less than age. Period effects were interpreted in terms of the modernization thesis on the assumption that modernization is captured by period effects and that people in society are changed by the substantial yearly alterations to the social structure as they unfold. The results showed that the substantial decline in fertility occurring after the onset of the Quiet Revolution could be described as largely a period effect. This finding was taken as support for the modernization thesis and was the basis for the subsequent multivariate path analysis in Chapter 6 on the structural determinants of Quebec fertility.

Period effects were decomposed into demographic, economic and social factors of both marriage and fertility trends in Quebec. The path analysis was informed by a social exchange perspective of marriage and fertility. The major demographic factor used in this analysis was the sex ratio of unmarried men to women. This variable was found to have a relatively strong overall effect on marriage and fertility. The sex ratio reflects the relative number of women and men eligible for marriage in the population. Theoretically, as the relative number of unmarried males increases there should be high gains to marriage for both sexes and, therefore, marriage is more attractive than cohabitation or remaining single. When unmarried women are more abundant than unmarried men in the population, there is a low sex ratio, so that both men and women have lower gains by being married. This is because men can reap many of the benefits of marriage without committing to a spouse. Women, whose chances of finding a husband are low, have to find other alternatives of economic support and so pursue education and careers. Increased female earning power further decreases the desire for marriage. When there is an abundance of unmarried men and the gains to marriage are high, there is greater marital stability (reflected by low divorce), a sexual division of labour (reflected by low married female labour force participation) and high fertility rates. When unmarried women are more abundant than men and the gains to marriage are low, there is greater marital instability, higher participation in the work force and low fertility rates. The results from the path analysis provide strong support for this theory, as all of the specified relationships were in the predicted direction.

Support was also found for the modernization thesis that predicts a negative relationship between rising individualism, marriage and fertility. According to this perspective, modernization reduces the gains to marriage by transferring the major functions traditionally performed by the family to other sectors of society. At the same time, a transformation in the ideology of a society occurs, from one based on collectivism to one based on individualism. Individualism erodes people's belief in traditional institutions, such as the Church, marriage and the family, while encouraging the pursuit of personal desires and gains. The consequences of individualism include a decrease in marriage, rising divorce and greater participation by married women in the economic sector, all of which contribute to a decline in fertility. The results of the path analysis showed that modernization, as indexed by individualism, reduced fertility in Quebec through its negative impact on female marriage rates. Individualism also effects fertility through marriage by increasing divorce and the participation rate of employed married women. These findings suggest that the rapid modernization that occurred during the Quiet Revolution in Quebec was an important determinant of fertility decline in the province.

Male unemployment rates and female-to-male income ratios were also included in the path model. From an social exchange point of view, these factors were said to influence the perceived gains to marriage and, thereby, increase or decrease fertility depending on the situation. Male unemployment was expected to decrease the gains to marriage for both sexes in that marriage would entail extra costs to males and the economic exchange for females would be substantially reduced. The empirical results indicated a negative relationship between male unemployment and marriage, but this finding was not statistically significant. Thus, the hypothesized relationship between male unemployment and fertility through its effect on marriage was not supported. However, male unemployment did have a strong effect on fertility through its effect on married female labour force participation, suggesting that when male unemployment was low in Quebec, married women were less likely to work -- and presumably stayed at home to raise their children -- and fertility was high. On the other hand, high male unemployment rates increased married women's participation in the work force, thus reducing their overall fertility. High male unemployment also decreased fertility indirectly through its effects on raising divorce probabilities. The findings of this analysis indicate that economic conditions in Quebec are strong determinants of fertility trends from 1941 to 1991.

Income ratio (female to male) was also expected to decrease the gains to marriage and thereby reduce marriage and fertility. This is because a sexual division of labour is theorized to maximize the gains to marriage. In this view, males exchange their economic resources for womenís domestic labour, childbearing and childrearing. An increase in female earning power was expected to decrease women's domestic contributions and lower the gains to marriage. In fact, the data show that as female earning power has increased in Quebec, there have been greater gains to marriage as indicated by a positive relationship between female earning power and marriage rates. As noted in Chapter 6, the earning power of both men and women have become important contributions to the marital exchange, encouraging men and women to enter marriage. A dual family income allows couples to maintain a higher standard of living than would be possible if they remained single. In summary, female earning power, through its effect on marriage had a positive but minor impact on Quebec's fertility.

7.1.1 Policy Implications

Quebec's low fertility rates have generated two diverse reactions from academics and government officials. The first position on Quebec's low fertility include those who advocate pro-intervention. The interventionists, primarily composed of demographers, journalists and government officials, argue that low birth rates in Quebec have reached crisis levels which can only be alleviated through government pronatal policies. According to the interventionists, the major reason for this crisis was that "too few babies were being born to francophones 'de vieille souche' ['of the old stock'] for political and economic stability, and that new immigration would lead to failures of assimilation..." (Disparaitre, 1988 in Maroney, 1992:7). Two demographers, Henripin and Lapierre-Adamcyk, were instrumental in bringing about Quebec's current birth incentive policies. Lapierre-Adamcyk, for example, identified the lack of a third child as the cause of Quebec's low fertility levels and assessed that the major impediment to childbearing was financial. Henripin urged government officials to offer benefits, in the form of both fiscal reward and services, based on the number of children in a family. These assessments have shaped Quebec's birth incentive policies since 1989. Monetary rewards are given to women in Quebec on the birth of a child whereby the most money is paid to women who have three or more children. Although the interventionists favour government intervention, they also recognize that in a democratic society, freedom of the individual can impede the overall effect of such policies. This acknowledgement often weakens their recommendations on Quebec's low fertility problem. Moreover, the Interventionists have not been able to address the unforseen consequences of their recommended birth incentive policies. Although the current policies have entailed government expenditure in the billions of dollars since 1989, there have not been substantial increases in Quebec's fertility rates. Additionally, most of the post-1989 increase has been accounted for by births to unmarried women. These results appear to be contrary to what the Interventionists had in mind when they originally proposed the policies.

The critical school, which has recently emerged in the literature, makes up the second perspective on Quebec's low fertility rates. Adherents of this position argue that Quebec's low fertility levels do not constitute a crisis but rather reflect the historical trends of all industrializing societies. Advocates of the Critical perspective charge that any crisis that has emerged over Quebec's fertility levels has been manufactured by the pronatal interventionists who favour government regulation of women and reproduction. For example, Maroney (1992) argues that against "the background of an unresolved national question, and with the intervention of journalists, demographers, and politicians, data and predictions that were at least five years old were invoked to create a (renewed) sense of demographic crisis" (p. 7). She charges that in pairing nationalism with pronatialism, demographers (notably Jacques Henripin) have used science to manufacture the potential threat of cultural genocide if women in Quebec continue to have few children. "Henripin's normative bias was made especially clear when he more recently asserted that human birth rates below reproduction should be read through ethological theory as an index of social sickness" (p. 20). Maroney also charges that Quebec demographer Lapierre-Adamcyk was directly responsible for the 1989-91 pronatal policies which reinforced the privatized family, something that Quebec feminists had been fighting against (Maroney, 1992:26). She concludes her analysis by stating that the monetary incentive policies initiated by the interventionists and adopted by the Quebec government marginalized women, eliding them as objects of demographic policy (p. 26). According to her views, women have not benefited from the incentive policies since "child care remains inadequate, expensive and inconvenient, women continue to bear the brunt of the double day, and one estimate suggests that 100,000 Montreal children live in poverty" (p. 28). She claims that in creating a crisis over Quebec's declining fertility rates, demographers have been the only ones to benefit. "All of this meant not only a chance to lobby for more funding for more studies, and greater access to government files, but also an opportunity to publicize the importance of their field. No longer plagued by the image problems of the early 1970s - 'The demographer? A strange little man.' - the demographer became a celebrity" (p. 25).

A behavioural analysis perspective on Quebec's current baby bonus policies, proposed by Krull and Pierce (1996), is an alternative view to those cited above. While emphasizing the design and engineering of social systems, this perspective differs from the interventionists in that it is experimental and emphasizes the importance of behavioural contingencies. Government policies and incentives are said to set up contingencies of reinforcement for individual behaviour and the modification of these contingencies increases or decreases the targeted behaviour. As mentioned above, Quebec recently has established a birth incentive system that provides increasing monetary payments for each subsequent birth, up to $8000 for third and subsequent births. Krull and Pierce's (1996) analysis of Quebec's fertility by parity suggests that the baby bonus policies are having a positive effect for third and subsequent births. However, the effect has not been large enough to substantially effect the total fertility rate. Krull and Pierce suggest that changes to the graded method of payment may be in order. More specifically, they suggest that payments of $500 for first births and $1000 for second births may not be enough to alter people's reproductive behaviour, especially since the major capital investment is for a first child (Maroney, 1992). Increasing these amounts may produce larger effects for first and second parity which should elevate the total fertility rates.

The path analysis in Chapter 6 indicated that fertility is closely tied to the marriage rate. These results suggest that Quebec could supplement a birth incentive program with an incentive system that is targeted at increasing early marriages, on one hand, and raising the desire for marriage (through increasing the gains to marriage), on the other. Payments could be given to couples who marry at an early age (for instance, in their twenties), which would increase the gains to marriage and would expand women's reproductive span within marriage. Waite (1995) also argues that the benefits of marriage are not currently well known outside of the research community and suggests that if the benefits are made public, marriage could become a more attractive option to people.

> As evidence accumulates and is communicated to individuals, some people will change their behavior as a result. Some will make different choices than they would otherwise have made because of their understanding of the costs and benefits, to them, of the choices involved.... I think that social scientists have an obligation to point out the benefits of marriage beyond the mostly emotional ones, which tend to push people toward marriage but may not sustain them when the honeymoon is over. We have an equally strong obligation to make polcy makers aware of the stakes when they pull the policy levers that discourage marriage" (p. 500).

Moreover, if current policies were to increase the monetary incentives for first and second births (currently at $500 and $1000, respectively), to make them substantial enough for women who want to have children to reduce their participation in the labour market, there would be an expected increase in overall fertility.

Obviously, the total cost of such a program would be substantial and the Quebec government would have to weigh the costs against other sectors of society that also require public money. Currently, the various family policies that are geared towards increasing births in Quebec, generate a total annual payout of over two-thirds of a billion dollars (Règie des rentes du Quèbec, 1994:23). Lucien Bouchard, while advocating an independent Quebec, is in a difficult position of balancing the enormous costs of birth incentive policies with a very large provincial debt. However, without such a system, and given the current trends in Quebec, it is unlikely that it will regain and maintain replacement levels of fertility. One implication is that Quebec may lose the demographic struggle of 'superiority in numbers' that it had successfully endorsed for over two centuries after the English conquest. This could threaten the long term survival of French Canadian culture in Quebec.

7.2 Methodological Limitations of the Thesis and Suggestions for Subsequent Research

A methodological limitation of this thesis concerns the problems of multicollinearity between the predictor variables, autocorrelation and the estimation of missing or incomplete data. Multicollinearity created limitations of the path analysis. One limitation concerned the fact that 1931 and 1936 had to be removed from the analysis because it was found that these two years were highly correlated with many of the predictors. A second limitation that was due to multicollinearity occurred in terms of testing additional paths (like the direct effects of individualism, female earning power, male unemployment and sex ratio on divorce or the direct effects of individualism, female earning power and sex ratio on married female labour force participation). It is theoretically possible that additional paths between the variables exist, but these relationships could not be tested due to high collinearity between some of the variables (for example, married female labour force participation was highly correlated with individualism).

In terms of autocorrelation, the Durbin Watson test was inconclusive for all equations. Although the test statistics were above the lower boundary, indicating the absence of zero order correlation of error terms, it could not be concluded that the test was statistically significant at .01. Differencing the variables did not improve the Durbin Watson statistic, as it should have in the presence of significant autocorrelation. Time period was included in the model to help minimize the effect of time trend on the analysis.

Most of the variables included in the path analysis required some form of estimation for certain years when the data was either not recorded or was not recorded by 5 year age groups. Although the estimation procedures used are common practice, they obviously are not as accurate as observed data. This may have introduced degree of error in the statistical model. However, graphic presentation of each variable (using the estimated and observed data) indicates the expected trend. Furthermore, the overall empirical results are quite reasonable in the light of the expectation from the theories applied.

Although aggregate data is suitable for a temporal analysis of fertility trends in Quebec, it does have some limitations. For example, it was not possible with the aggregate data to separate Quebec-born from foreign-born or French-Canadian women from non-French-Canadian women. It would have been particularly useful to have been able to focus on differences between French-Canadian women and non-French Canadian women in Quebec given the implications of low fertility for the survival of French-Canadian culture.

An analysis of individual level data would enhance our understanding of the impact of modernization on Quebec's fertility. Large data sets, available from the Public Use Sample Tapes (PUST) of the Canadian Census of 1971, 1981, and 1991, contain information on many social, demographic and economic variables that are not available at the aggregate level. Moreover, the problem of missing data that was encountered in the earlier analyses would be avoided. The variables included in these individual data sets are also recorded by single years of age. This allows the researcher to assess the impact of modernization on women's fertility at each age throughout their childbearing years (19 to 39). Moreover, the sex ratio theory can be tested using a more refined measure than the one used in this thesis. In this sense, the refined sex ratio measure takes into account the 'mating gradient' which states that men usually marry women a few years younger than themselves (i.e. males, (25-29) divided by females, (23-27)). The micro data would further allow an analysis of four generations of women (1942, 1952, 1962 and 1972 birth cohorts). French-Canadian cohorts could be analyzed and compared to non-French-Canadian cohorts. Examining these distinct cohorts at different times would further assess the factors that influenced the fertility behaviours of French-Canadian and non-French-Canadian women before and after the Quiet Revolution.

Cases from the Census Sample Tapes can be integrated into a single file with a year value and a cohort value attached to each individual case. Thus, for any given single year of age, it is possible to analyze the effects of time, cohort and other predictors on the number of children ever born to French Canadian and non-French Canadian women in Quebec. Possible dependent variables could include the following: (1) number of children ever born; (2) childlessness (no children); (3) one child; (4) two children; (5) three or more children. As well, several independent variables could be used: (1) economic variables (wife's highest level of schooling; husband's highest level of schooling, wife's occupational status, husband's occupational status, household income, wife's total income, husband's total income); (2) demographic variables (current age at first marriage of husband and wife, residence, cohort); (3) cultural variables (wife's religion, husband's religion, home language). It would be expected that the effects of selected independent variables will vary depending on cohort membership (time of birth) and the time period that family formation took place.

A possible structure of the data is outlined in Figure 7.1 and is presented here to demonstrate how the different cohorts can be analyzed. First, it is possible to compare fertility differentials among young women at age 19 across three time points (1 vs. 2 vs. 3). Second, one can study how the 1952 birth cohort behaves over time in terms of fertility as it ages (1, 5, 8). Third, one can assess how a Quiet Revolution generation differs from a pre-Quiet Revolution cohort when the two groups of women are both at the age of 29, which is more or less the peak of childbearing (5 vs. 4). Fourth, it is possible to assess how a post-Quiet Revolution cohort differs in terms of fertility from a pre-Quiet Revolution cohort, when both are at the peak of childbearing (6 vs. 4). Fifth, analysis can determine how a Quiet Revolution generation differs from a pre-Quiet Revolution cohort when the two sets of women are both at the age of 39, which is more or less the end of childbearing (8 vs. 7). Sixth, it is possible to analyze the progression of the 1962 cohort

FIGURE 7.1: Structure of Cohort Data (Micro Analysis)

Census Period		
1971	**1981**	**1991**
Age 19 (DB=1952) **(1)**	Age 19 (DB=1962) **(2)**	Age 19 (DB=1972) **(3)**
Age 29 (DB=1942) **(4)**	Age 29 (DB=1952) **(5)**	Age 29 (DB=1962) **(6)**
	Age 39 (DB=1942) **(7)**	Age 39 (DB=1952) **(8)**

DB = Year of Birth of Cohort

from the age of 19 to the age of 29 and compare it with the progression of the 1952 cohort from the age of 19 to the age of 29 (2 & 6 vs. 1 & 5). Finally, one can analyze the progression of the 1952 cohort from the age of 29 to the age of 39 and compare it with the progression of the 1942 cohort from the age of 29 to the age of 39 (5 & 8 vs. 4 & 7). Furthermore, these seven contrasts can be made for French-Canadian and non-French-Canadian women respectively, which is not possible to do with aggregate data.

Findings from the proposed microanalysis would supplement those that were obtained in this thesis using aggregate data and enhance our understanding of the factors that influenced fertility change in Quebec. A comprehensive understanding of the determinants of fertility change in Quebec would allow for more informed government policies directed at the amelioration of this province's extremely low fertility rates. Finally, further demographic analyses are required to assess the effectiveness of current pronatal policies and determine whether additional measures are necessary to reverse Quebec's dramatic decline in fertility. Factors found to effect fertility in this thesis, such as the impact of modernization during the Quiet Revolution, fluctuations in the economy and changes to the demographic composition of Quebec's population, warrant further analysis especially when it is considered how much this province has to lose if fertility rates remain below replacement levels.

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Appendix A: SPSS OUTPUT OF FACTOR ANALYSIS

```
Extraction  1 for analysis  1, Principal Components Analysis (PC)

Initial Statistics:

Variable      Communality          Factor       Eigenvalue    Pct of Var    Cum Pct
FEDUC         1.00000  *           1            4.07113       58.2          58.2
MEDUC         1.00000  *           2            1.73339       24.8          82.9
FNOREL        1.00000  *           3            .54905        7.8           90.8
MNORELIG      1.00000  *           4            .47109        6.7           97.5
URBAN         1.00000  *           5            .13927        2.0           99.5
MUNEML        1.00000  *           6            .02458        .4            99.8
INCRATIO      1.00000  *           7            .01150        .2            100.0

PC extracted  2 factors.
Factor Matrix:
              Factor  1        Factor  2
FEDUC         .95547           -.01196
MEDUC         .91691           -.28440
FNOREL        .93432           .28761
MNORELIG      .96420           .17541
URBAN         .70209           -.23726
MUNEML        .10428           .86908
INCRATIO     -.10517           .85281

Final Statistics:
Variable    Communality  *  Factor  Eigenvalue  Pct of Var  Cum Pct
FEDUC         .91306  *     1       4.07113       58.2       58.2
MEDUC         .92160  *     2       1.73339       24.8       82.9
FNOREL        .95567  *

Variable    Communality  *  Factor  Eigenvalue  Pct of Var  Cum Pct
MNORELIG      .96045  *
URBAN         .54922  *
MUNEML        .76617  *
INCRATIO      .73835  *

VARIMAX  rotation  1 for extraction  1 in analysis  1 - Kaiser Normalization.
VARIMAX converged in 3 iterations.

Rotated Factor Matrix:
              Factor  1   Factor  2

FEDUC         .95554      -.00254
MEDUC         .91967      -.27534
FNOREL        .93144       .29681
MNORELIG      .96242       .18491
URBAN         .70439      -.23032
MUNEML        .09570       .87007
INCRATIO     -.11358       .85173
```

```
Factor Transformation Matrix:
                  Factor  1        Factor  2
Factor  1         .99995           .00987
Factor  2         -.00987          .99995

2 PC  EXACT  factor scores will be saved.

Following factor scores will be added to the working file:
Name                     Label
Individualism            REGR factor score  1 for analysis   1
Economic Resources       REGR factor score  2 for analysis   1
```